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Blond and Brunette Traits—
Donald G. Paterson and Katherine E. Ludgate

News Notes Book Reviews Abstracts

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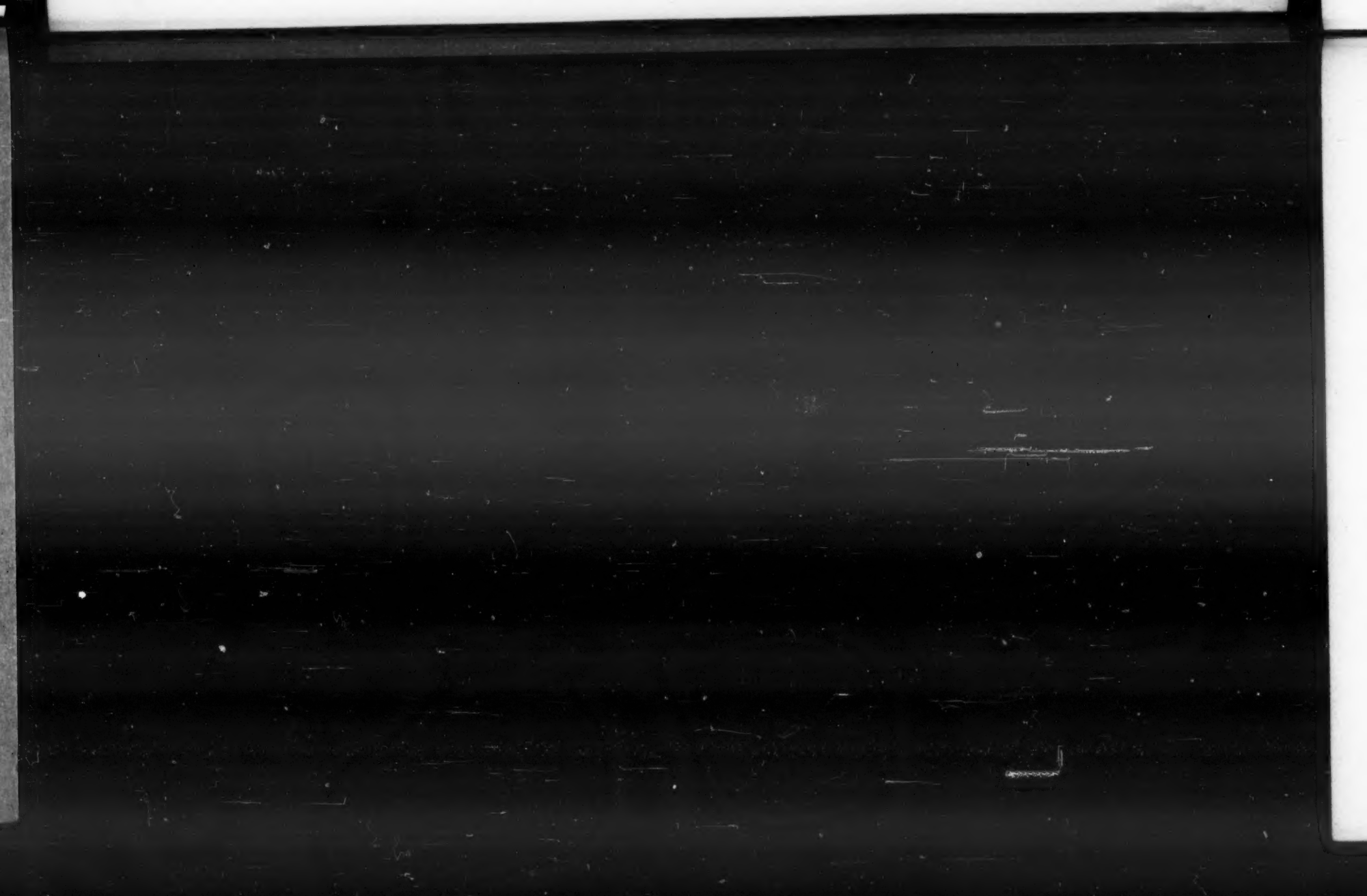


Some Business Applications of a Mental Alertness Test

COMPILED AND EDITED by A. W. KORNHAUSER,[1] *University of Chicago*

Summary.—The present paper reports the results obtained in a series of experimental application of The Scott Company mental alertness tests in business establishments. A brief description of the test with illustrative examples is given. The test is found to give results that agree fairly well with the ability of office workers as rated by their supervisors and with the ability of student-employees in a factory school as indicated by their success in the school. Other comparisons are reported that show marked differences in mental alertness test scores between men and women office employees, between different occupational groups, between applicants and employees in clerical and typing positions, and between groups of workers in like occupations in different companies. A further comparison shows that mental alertness test scores are rather definitely related to turnover among clerical workers. The various results cited, as far as they go, point to the practicability and desirability of using intelligence tests in certain phases of personnel work—as aids in selection, classification, and the study of special problems, particularly with reference to office employees. Further applications of mental alertness tests along the lines described in this paper are being actively carried on by the Scott Company.

INTELLIGENCE tests have become suprisingly popular since their widespread use in the United States Army. Comparatively few findings from the industrial use of similar tests, however, have been published. While the success of the Army testing program has been widely conceded, evidence is still meager as to any corresponding feasibility and usefulness of general ability tests in industry. Scientific evaluations of test applications in the business world and reports of such studies are greatly needed if we are to be in position to judge the success and shortcomings of such applications.

The present paper reports the methods used and the results obtained in a series of experimental applications of a general intelligence test in several business establishments during the year 1919–1920.

[1] The work reported in this paper is distinctly a group product, in which a number of the members of The Scott Company staff coöperated. It is especially, however, the work of Beardsley Ruml and D. G. Paterson. Acknowledgement is also due to the field operators of the Company who contributed by building up a situation in industry in which the tests could be successfully administered and used. Much of the present material is taken directly from Scott Company Bulletins. The paper reports only the earlier stages of work that has continued to go forward.

I

The Scott Company mental alertness test is, in general nature, the same kind of test as the Army intelligence examination. It aims to ascertain such qualities as quickness and accuracy of thinking and ability to learn. The test consists of a series of six parts. These are as follows:

1. Arithmetical reasoning (Arithmetic Test), e.g.,

> How much will you have to pay for 3 one-cent postage stamps and 3 two-cent postage stamps?
> If 144 cubic feet of water are drawn from a tank 12 feet long and 6 feet wide, how much is the surface of the water in the tank lowered?

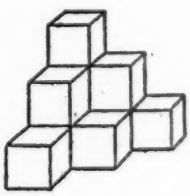
2. Giving the opposites of words (Opposites Test). The person tested is to underline the one of four words that is opposite in meaning to a given word, e.g.,

> **Light**—(sun, dark, day, weight).

3. Seeing relationships between words (Analogies Test). A line is to be drawn under the one of four words in parentheses that is related to the third word in the same way that the second word is related to the first. e.g.,

> eye is to see as ear is to (**song, hear, blue, bright**)

4. Counting cubes in pictures showing figures built of cubical blocks (Cube Analysis Test), e.g., count the number of blocks used to build this figure:



5. Rearranging letters to form words (Disarranged Words Test). A number of sets of mixed up letters are to be rearranged to spell the names of animals, e.g.,

> **t c a**
> **p e a t n o l e**

6. Solving problems of combining coins (Coin Test), e.g.,

> **What 3 coins add up to 55 cents?**
>
> | | |
> |---|---|
> | | Halves |
> | 2 | Quarters |
> | | Dimes |
> | 1 | Nickels |
> | | Cents |

Each test part contains some ten to twenty-five items of the kind shown in the examples, but of various degrees of difficulty. Instructions are printed at the beginning of each of the test parts. Time limits have been set for each part, short enough that even the most alert individual is unable to make a perfect score. At the same time, each test part is easy enough so that even the rather dull individual can make some score. To make the tests as free as possible from the influence of formal schooling, no difficult and unusual words were used or special items of information. To avoid the ridiculous or absurb, especial effort was made to eliminate any false or foolish statements or any problems calling for knowledge of an unusual or strange nature.

The tests are so designed that they can be given to individuals or to groups. They can be given by an intelligent clerk after a few hours of instruction.

ASSIGNMENT

SERIES I

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO BEGIN

Examining Company.....

Date of Test.....Test conducted by.....

A	
B	
C	
D	
E	
F	
TOTAL	

Name.....Age.....Sex, M or F

Applicant or Employee?.....

What has been your main occupation?.....

Just what work do you do?.....

How long have you worked at your occupation?.....

Draw a circle around the highest grade of school reached:.....
Grades 1, 2, 3, 4, 5, 6, 7, 8. High School, year 1, 2, 3, 4. College, year 1, 2, 3, 4.

At what age did you leave this highest grade?.....

Have you ever taken any special business or technical training?.....

If you have, draw a circle around the kind of school attended:

Night.	Correspondence.	Technical.
Business.	Trade.	Company.

Name of school where course was taken.....

Kind of course taken.....Length, years.....months.....

If applicant, for what position are you applying?.....

If employee, in what department are you employed?.....

On what job?.....How long have you worked on it here?.....

DIRECTIONS

On the inside pages there are six tests. You are told exactly what to do at the top of each test. Follow those directions. **If you finish a test, do not turn over to the next page until you are told to.**

You do not have to do all of each test in order to make a good score. The average person can only do about half of each test in the time allowed. The tests do not depend upon your school training. Many grammar school students are able to do as well as some college students

Do not turn this page until you are told to begin

9820.
FORM 1055 5-22

TEST A

Get the answers to these questions as quickly as you can. Then write the answer after the question.
Use the side of the page to figure on if you need to.
If you cannot get the answer to a question, pass on to the next one.

1. How many are 10 apples and 5 apples? *Answer*.....
2. If you drive 6 miles an hour for 2 hours, how far do you drive? *Answer*.....
3. If 24 men are divided into 6 equal gangs, how many men will be in each gang? *Answer*.....
4. Jim had $15 in the bank and drew out $7. How much did he have left? *Answer*.....
5. If you save $10 a month for 3 months, how much will you save? *Answer*.....
6. How many are 8 men and 9 men and 8 men? *Answer*.....
7. How much will you have to pay for 3 one-cent postage stamps and 3 two-cent postage stamps? *Answer*.....
8. How many pencils can you buy for 60 cents at the rate of 2 for 5 cents? *Answer*.....
9. If you buy 3 packages of tobacco at 9 cents each and a pipe for 50 cents, how much change will you get back from $5.00? *Answer*.....
10. If it is 75 miles from Dayton to Columbus and the railroad fare is 3 cents a mile, how much will it cost you to make two round trips? *Answer*.....
11. If your board cost $4 a week, your room $2.50, you save $3.25 and your weekly wages are $21, how much do you have left each week for other things? *Answer*.....
12. If the inside dimensions of a box are 10 feet by 5 feet 6 inches by 3 feet, how many cubic feet will it hold? *Answer*.....
13. How long could you keep 4 electric lights going on the amount of current required to keep 3 similar lights going 2 hours? *Answer*.....
14. If 4 three-ton trucks require 3 trips apiece to remove a pile of scrap, how many similar trucks making only one trip each would be required to remove half the pile? *Answer*.....
15. If 144 cubic feet of water are drawn from a tank 12 feet long and 6 feet wide, how much is the surface of the water in the tank lowered? *Answer*.....
16. An æroplane flew 3 miles in 72 seconds. How many miles an hour is that? *Answer*.....
17. How many hours is it from 8 A. M. May 27 to 10 P. M. July 3? May has 31 days and June has 30. *Answer*.....

TSCO.
FORM 1012 9-22

TEST B

After each word in heavy type there are four words. Underline the one of these four words that is exactly opposite in meaning to the word in heavy type.

Samples 1 and 2 are done correctly.

Sample 1. **Light**—(sun, dark, day, weight).

Sample 2. **Cry**—(laugh, play, baby, sad).

Begin with number one and work as fast as you can. If you are not sure, guess.

1. **High**—(tall, low, sky, deep).
2. **Out**—(empty, up, in, go).
3. **Summer**—(spring, winter, hot, swim).
4. **White**—(black, clean, dress, cotton).
5. **Slow**—(freight, clumsy, fly, fast).
6. **Yes**—(agree, no, sure, must).
7. **North**—(cold, east, hot, south).
8. **Above**—(sky, hole, below, high).
9. **Top**—(bottom, sides, box, spin).
10. **Good**—(bad, rough, boy, nice).
11. **Wet**—(damp, rain, dry, sand).
12. **Up**—(high, down, town, stairs).
13. **Rich**—(gold, man, starve, poor).
14. **Front**—(back, yard, door, side).
15. **Long**—(far, short, close, thin).
16. **Hot**—(fire, ice, cold, stove).
17. **East**—(north, sun, west, right).
18. **Day**—(light, hour, dark, night).
19. **Big**—(large, little, giant, full).
20. **Love**—(hate, girl, grief, enemy).
21. **Buy**—(price, sell, hat, cheap).
22. **Boy**—(school, bad, play, girl).
23. **Soft**—(hard, brittle, smooth, rubber).
24. **Weak**—(day, sick, big, strong).
25. **First**—(foremost, second, last, prize).

TSCO.
FORM IQ22 8-22

TEST C

In each of the lines in this test, the first two words fit each other in a definite way. You are to draw a line under the one word in heavy type that fits the third word in just the same way that the second word fits the first. Look at Sample 1.

SAMPLE 1. boy is to man as kitten is to (cat, dog, rat, girl).

The word cat is underlined because a cat is a grown up kitten just as a man is a grown up boy. Look at Sample 2.

SAMPLE 2. eye is to see as ear is to (song, hear, blue, bright).

The word hear is underlined because hear fits ear just as see fits eye. We hear with our ears and we see with our eyes.

Begin with number 1 and work as fast as you can without making mistakes.

1.	eat	is to	bread	as	drink	is to	(water, thirsty, swallow, taste) 1
2.	man	is to	home	as	bird	is to	(fly, nest, tree, sings) 2
3.	feathers	is to	bird	as	fur	is to	(soft, warm, bear, brown) 3
4.	shoe	is to	foot	as	hat	is to	(coat, straw, head, sun) 4
5.	door	is to	house	as	gate	is to	(swings, hinges, yard, latch) 5
6.	wash	is to	face	as	sweep	is to	(floor, broom, straw, clean) 6
7.	cold	is to	ice	as	heat	is to	(wet, cold, hot, fire) 7
8.	penny	is to	copper	as	dime	is to	(quarter, silver, spend, penny) 8
9.	food	is to	man	as	fuel	is to	(burn, coal, engine, wood) 9
10.	sit	is to	chair	as	sleep	is to	(rest, wake, snore, bed) 10
11.	sweet	is to	sugar	as	sour	is to	(unpleasant, bitter, taste, lemon) 11
12.	summer	is to	spring	as	autumn	is to	(spring, winter, summer, fall) 12
13.	swim	is to	water	as	fly	is to	(air, bird, kite, arrow) 13
14.	egg	is to	bird	as	acorn	is to	(grow, fall, oak, hard) 14
15.	love	is to	friend	as	hate	is to	(dislike, enemy, sister, admire) 15
16.	minute	is to	second	as	hour	is to	(day, second, minute, watch) 16
17.	automobile	is to	wagon	as	motorcycle	is to	(ride, speed, bicycle, car) 17
18.	pan	is to	tin	as	table	is to	(chair, wood, legs, dishes) 18
19.	skin	is to	body	as	bark	is to	(tree, dog, bite, noise) 19
20.	Tuesday	is to	Monday	as	Friday	is to	(week, Thursday, luck, Saturday) 20
21.	man	is to	arm	as	tree	is to	(shrub, limb, roots, bark) 21
22.	father	is to	son	as	mother	is to	(aunt, nephew, daughter, sister) 22
23.	shoestring	is to	shoe	as	button	is to	(coat, bone, bell, hook) 23
24.	fin	is to	fish	as	wing	is to	(fly, air, bird, sail) 24
25.	above	is to	below	as	top	is to	(spin, bottom, surface, side) 25

TSCO.
FORM 1032 6-22

TEST D

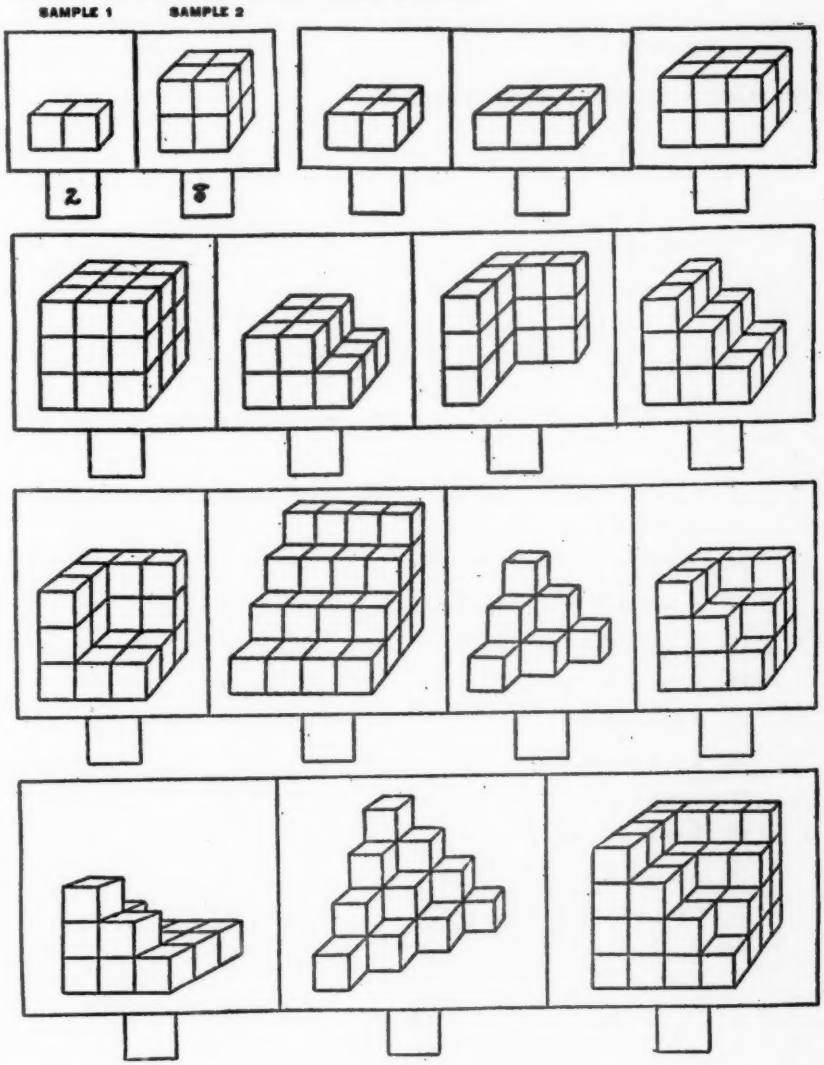
Here are some figures built out of cubical blocks. All the blocks are the same size and shape. You are to count the number of blocks used to build the figures shown below. Think how the figure would look from all sides; remember that there are more blocks than the ones you can actually see in the picture.

Count the number of blocks used to build each figure and write your answer in the little square just below.

Look at Sample 1. This is built with two blocks, so 2 is written in the little square.

Look at Sample 2. Eight blocks were used to build this, so 8 is written in the little square.

Work as fast as you can without making mistakes.



TSCG.
FORM 1042 6-22

TEST E

On each line of this test there are some letters. The letters on each line can be arranged to spell the name of an animal. Look at Sample 1.

SAMPLE 1. t r a ___*rat*___

The letters **t r a** when properly arranged spell rat.

You are to write after each group of letters the name of the animal that can be spelled with those letters. Begin with the first. If you come to one you can't do pass on to the next.

Work as fast as you can without making mistakes.

1. **t c a** 1
2. **r e d e** 2
3. **n i o l** 3
4. **t g r e i** 4
5. **s n k u k** 5
6. **e r b a** 6
7. **l f o w** 7
8. **b a r z e** 8
9. **b n s i o** 9
10. **k m y e o n** 10
11. **u r t l e t** 11
12. **d u o n h** 12
13. **h a p l e n t e** 13
14. **d e l o p r a** 14
15. **s e l w a e** 15
16. **g o r o a n k a** 16
17. **y c t e o o** 17
18. **k u n m p c h i** 18
19. **p e a t n o l e** 19
20. **l q r i u r s e** 20

TSCO.
FORM 1052 6-22

TEST F

In this test you must think about coins. Here is a sample question to show you what the test is like.

Sample 1. What 3 coins add up to 55 cents?

	Halves
2	Quarters
	Dimes
1	Nickels
	Cents

The answer is 2 quarters and 1 nickel. Notice that all you have to do is to write the correct numbers in the square before the name of the coins.

Be sure that you select exactly the number of coins asked for in the question and be sure that they add up to the correct amount.

Begin with the first question. If you come to a question you can't answer, go on to the next one.

Work as fast as you can without making mistakes.

QUESTION 1
What 3 coins add up to 60 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 2
What 3 coins add up to 35 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 3
What 4 coins add up to 41 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 4
What 3 coins add up to 85 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 5
What 4 coins add up to 70 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 6
What 5 coins add up to $1.11?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 7
What 4 coins add up to 30 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 8
What 6 coins add up to 73 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 9
What 5 coins add up to 60 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 10
What 5 coins add up to 90 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 11
What 7 coins add up to 25 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

QUESTION 12
What 6 coins add up to 40 cents?

	Halves
	Quarters
	Dimes
	Nickels
	Cents

TSCO.
FORM 1062 6-22

The entire examination takes less than twenty minutes. Scoring the papers is a mechanical process accomplished by means of special scoring stencils.

II

The description of mental tests tells little concerning their value. The one safe method by which to judge the worth of a test is to try it and see if it works. A priori opinions regarding tests have repeatedly been contradicted by later results. The most straight-forward procedure for "testing the test" can be very briefly stated,—The test aims to select people with respect to their ability for some job or course of training. The test can be tested, accordingly, by giving it to persons whose ability is already known. If test scores agree with the known ability of the persons tested, the test is insofar satisfactory. And it can then be used to predict in advance the ability of unknown persons of the same general group as those upon whom it has been tried. Several experiments of the nature will be briefly described.

Mental alertness test scores in relation to ability among office employees

The first results presented are those obtained from the examination of 19 women employees in department N, company C. The department handles all transcribing and addressing work for the organization. The women employees are classified as stenographers, typists, and clerks. There is a relatively high turnover in the department because it operates as a sort of vestibule school. Those who do the best work are transferred to other departments as requisitions for first class stenographers, typists, clerks and secretaries are received by the employment department. Due to this selective influence and also to the heterogeneity of the occupations in the group tested, our results are not to be interpreted as necessarily typical or representative of results generally in the testing of clerical workers.

TABLE 1

Comparison of mental alertness test scores of women office workers in department N, company C with ratings of their ability by supervisors

EMPLOYEE	TEST SCORE	RANKING BY TEST	RANKING IN ABILITY BY TWO SUPERVISORS
A	67	1.0	2.0
B	63	2.0	3.5
C	61	3.0	5.0
D	59	4.0	6.0
E	54	5.0	7.0
F	52	6.0	1.0
G	50	7.5	14.0
H	50	7.5	9.0
I	48	9.0	3.5
J	47	10.0	12.0
K	46	11.0	15.0
L	43	12.0	18.0
M	41	13.0	8.0
N	40	14.0	16.5
O	37	15.0	10.0
P	36	16.0	13.0
Q	32	17.0	11.0
R	23	18.0	16.5
S	15	19.0	19.0

Ratings of the ability or "general value" of the 19 individuals tested were obtained from two department supervisors. Table 1 shows the test scores and rank order of the people tested and the ranks assigned them by the supervisors. A rank of "1" is highest and "19" is lowest. In case of a tie both receive the same rank. For example, employees G and H both

scored 50 points and are tied for seventh and eighth places. They are given their average rank, 7.5. The agreement is seen to be fairly close between the ranking according to test scores and that made by the supervisors. The correlation coefficient (rank difference method) is 0.76.

The results for department M, company B are presented in table 2.

TABLE 2

Comparison of mental alertness test scores of women office workers in department M, company B with ratings of their ability by supervisors

EMPLOYEE	TEST SCORE	RANKING BY TEST	RANKING IN ABILITY BY SUPERVISORS
A	49.0	1.0	1
B	48.0	2.0	6
C	45.0	3.0	3
D	44.5	4.0	4
E	42.5	5.0	5
F	40.0	6.0	2
G	38.5	7.5	7
H	38.5	7.5	8
I	36.5	9.0	11
J	32.5	10.0	14
K	32.0	11.0	13
L	30.0	12.0	9
M	28.0	13.0	12
N	24.0	14.0	10

They indicate a closer relationship between test results and supervisors' ratings than was found in the department considered in table 1. The correlation coefficient in this case is 0.82.

Table 3 gives the results for a department in which no agreement was found between test results and supervisor's ranking. (Correlation coefficient of 0.40.) The reason for the lack of agreement appeared when it was discovered that the supervisor had ranked the employees largely on the bases of their length of service with the Company. (The correlation between supervisor's ranking and length of service is 0.77.) It is, of course, highly improbable that length of service is so closely related to ability. The poor relation found in this group is probably due rather to the unreliability of the ratings than to the inadequacy of the mental test.

TABLE 3

Comparison of mental alertness test scores of men office workers in department O, Company C with ratings of their ability by a supervisor

EMPLOYEE	TEST SCORE	RANKING BY TEST	RANKING IN ABILITY BY SUPERVISOR	NUMBER OF MONTHS IN DEPARTMENT
A	67.5	1	3	27
B	66.0	2	7	8
C	64.5	3	9	10
D	62.5	4	10	13
E	56.0	5	5	12
F	47.0	6	8	8
G	45.5	7	4	25
H	43.0	8	2	25
I	38.5	9	1	36
J	37.0	10	6	13

Mental alertness test scores in relation to the ability of students in a factory school

A second experiment in the use of mental alertness tests was conducted in the educational department of a large industrial plant. Test scores were used as a basis for classifying students into sections in accordance with their ability to learn. The course under consideration is one requiring three years, designed to train groups of factory employees for minor executive positions. These employees have been

selected to learn all the major production operations in the plant and are instructed in the principles of management. A plan of classifying the men according to ability had been in use for some time before mental tests were tried for the purpose.

The purpose in thus dividing students into groups according to their ability to learn, is to make possible more efficient instruction and more satisfactory arrangements for individual progress. More competent students are enabled to go forward at a rapid rate, unhampered by duller classmates, and similarly poor students are permitted to work each at his own best pace, in company with men of approximately like ability. This general principle of classification and progress according to ability is coming to be widely accepted as an educational method in public schools, colleges, and special training courses.

In the factory school under consideration the older basis for classification was the public school record of the men. High school graduates or their equivalent were placed in section A. Grammar school graduates or men of equal ability were placed in section B. Men having less than eight years of schooling were placed in section C. As time went on it became apparent that this system of classification was unsatisfactory. It was found, for example, that some men who had been placed in section C and who had only fifth grade schooling, were really able to do the work of section B. It was then necessary to transfer them. Some in section B were found later to be qualified to do section A work. Likewise certain individuals with a high school education were not able to do the work of section A and had to be placed in section B. Such shifting from one section to another after the course was partially completed wasted the time of instructors and students and introduced a certain amount of disorganization into the work as well as resulting in unnecessary discouragement to those students who had to be demoted.

The instructors desired to determine if the mental alertness test would provide a more satisfactory basis of classification. The results that were obtained are shown in figure 1. Each student-employee's score is represented by a dot. The students are shown classified into the three sections A, B, and C, according to the ability they had shown in doing the work of the course.

The test scores divide the students with remarkable exactness. All class A students scored over 41 points on the test. Only one class B student scored more than 41 points and the instructors stated that he might be a class A man if he applied himself. Similarly there is a fairly good division between class B and class C. Only three class C students scored more than $23\frac{1}{2}$ points (and one of these according to the instructors might do B work if he tried) while only three class B students scored less than that. The class limits drawn in Figure 1 appear to furnish a satisfactory basis for classification of students in the course. In this experiment, in other words, test scores obtained in twenty minutes are demonstrated to be of decided value in classifying men in a way that later achievements show to be substantially correct.

Results pointing in the same direction as the foregoing were obtained in an executives' course in Factory Management and Modern Production Methods. Mental alertness tests were given to 122 foremen taking the course and comparisons made between these scores and the mark which each individual obtained in the final examination of the course. The following figures show roughly the nature of the agreement found—Foremen who passed the final examination with a mark of 90 or better had an average mental alertness test score of 62; foremen who made a mark of 60 or less in the final examination had an average mental test score of 38. Stated the other way about,—Foremen with a score of 60 or better in mental alertness averaged 81 in the final examination; foremen who made a score of less than 40 in the mental alertness test averaged 63 in their final examination.

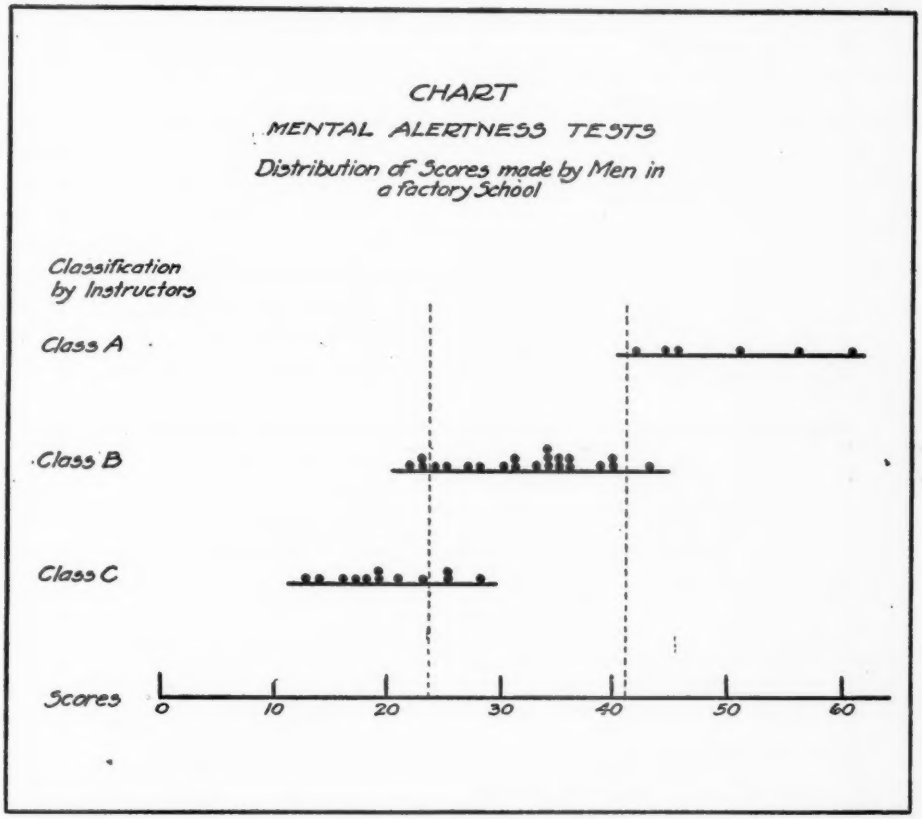
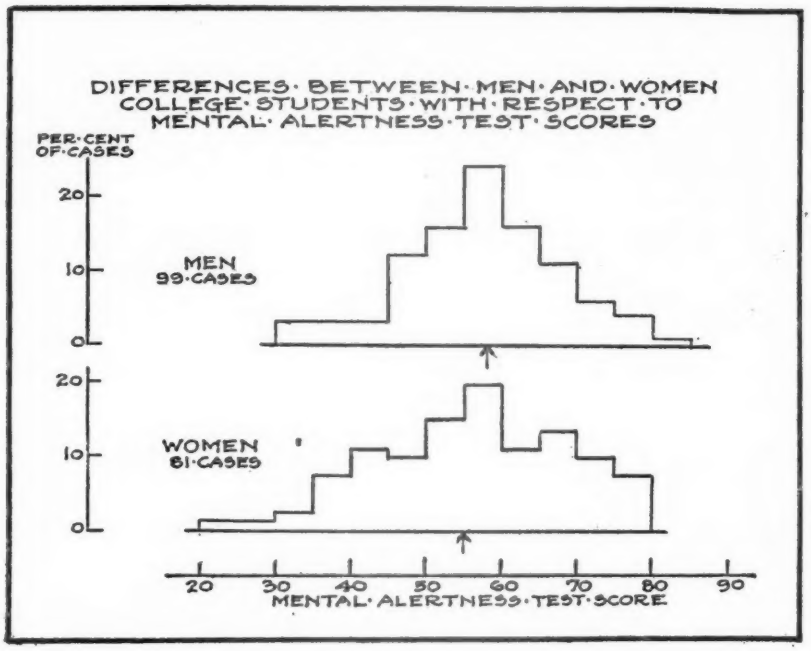


FIG. 1

III

A few illustrations of the use of mental alertness tests as aids in personnel work may now be described, which differ from the preceding ones in that no direct check or method of "testing the test" is involved.


DIFFERENCES BETWEEN MEN AND WOMEN
COLLEGE STUDENTS WITH RESPECT TO
MENTAL ALERTNESS TEST SCORES
PER CENT OF CASES
20
10
0
MEN
99 CASES
20
10
0
WOMEN
81 CASES
20 30 40 50 60 70 80 90
MENTAL ALERTNESS TEST SCORE

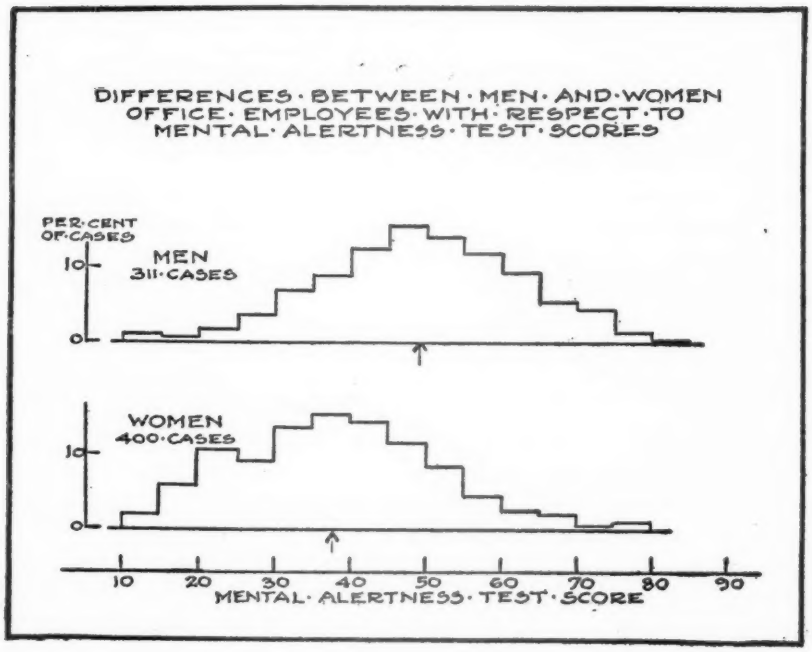

DIFFERENCES BETWEEN MEN AND WOMEN
OFFICE EMPLOYEES WITH RESPECT TO
MENTAL ALERTNESS TEST SCORES
PER CENT OF CASES
10
0
MEN
311 CASES
10
0
WOMEN
400 CASES
10 20 30 40 50 60 70 80 90
MENTAL ALERTNESS TEST SCORE

FIG. 2

Comparison of mental alertness test scores of men and women office employees

The striking difference in mental alertness test scores found between men and women office employees is shown in figure 2. The distribution of the scores of 311 men office employees and for 400 women office employees is shown in the lower half of the figure. The average score for the men is 49 points. For the women the average is 38 points.

That the difference found between men and women office employees is not due to the nature of the test is shown by the comparison of men and women college students in the upper half of figure 2. Men and women college students in a coeducational institution are presumably of approximately equal ability. Accordingly, if the tests are equally suited to men and women, little difference in test score should be found between the men and women students. This is found to be the case. The average score of the men is 58; that for the women 55.

The difference in test scores between men and women office workers can be stated, with almost complete certainty, to be due to a real difference in mental ability of the sort which tests measure. Obviously, however, this implies nothing whatever as to any general difference between men and women in mental alertness. There are evidently a number of selective factors which may go to explain the superiority of the men office employees.

Differences in mental alertness test scores in different occupations

That mental alertness test scores should differ for different occupational groups is obvious.[2] It is accordingly necessary that standards be set for various occupations if a test is to be used for selective purposes. Standards for the Scott Company test have been set for six occupational groups. The standards are shown in table 4. Because of the fact that there are significant differences between the mental alertness test scores of men and those of women within the same occupation, separate standards have been set in occupations where both men and women are to be selected. In establishing the standards, only the test

TABLE 4

Mental alertness test standards for various occupational groups

OCCUPATION	NUMBER OF INDIVIDUALS	AVERAGE SCORE	CRITICAL SCORE*
Men:			
Stenographers	26	59	40
Bookkeepers	25	50	35
Draftsmen	58	49	32
Clerks	245	47	33
Office boys and messengers	135	33	15
Women:			
Stenographers	70	45	33
Typists	55	44	30
Clerks	235	36	25

* The critical score is the score below which workers in the occupation are, in general, found to be unsatisfactory. If an applicant scores below the critical score for his occupation and sex he should possess compensating qualifications to be favorably considered for employment.

[2] Interesting reports of differences in intelligence test scores made by different occupational groups in the Army have been published in the Memoirs of the National Academy of Sciences, vol. 15, p. 819 ff. Certain of these results are cited by Yoakum in the Journal of Personnel Research, vol. 1, p. 24 ff.

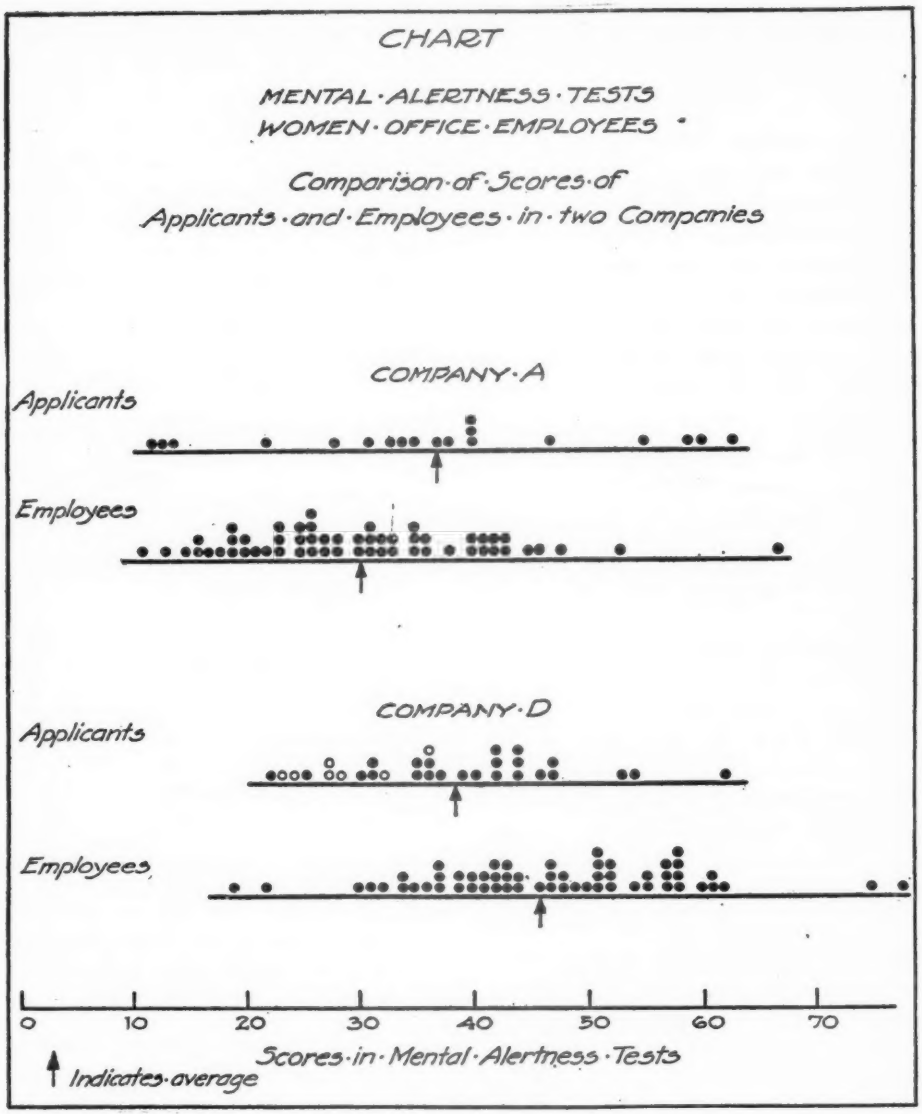


FIG. 3

records of employees and accepted applicants were included.

Relation of mental alertness test scores of applicants to mental alertness test scores of employees

The results presented here are the outcome of a study carried on in two companies where mental alertness test scores were obtained for office applicants and employees. In company A, all women applicants for clerical positions were tested and the scores were compared with those of women clerical employees in three office departments. In company D, women

applicants for stenographic and typist positions were tested and the scores compared with those of women stenographers and typists at work in the offices. These comparisions are shown in figure 3. Each dot represents one individual; the circles represent seven applicants who were rejected by company D.

The mental alertness level of the applicants in the two companies appears to be approximately the same. If so, the sources of supply that are being tapped by the two companies are comparable as regards the intelligence of the individuals. But there is a striking difference between the employees at work in the positions considered in company A as compared with those in company D.

It is obviously impossible properly to interpret the facts brought out in figure 3 without knowing whether the source of supply in the companies has remained constant for a considerable time, whether both companies have used the same careful methods of selection for some time, and whether the policies in regard to wages and other matters have been similar. This knowledge is not at present available. Some facts, however, throw a little light upon the situation pictured in the chart. There is some evidence, for example, that company A attempts to select high grade applicants for office positions but that this type of applicant does not remain long with the company. The data, though meager, indicate that these individuals of greater ability leave to avail themselves of better opportunities and higher wages elsewhere.

Comparisons of mental alertness test scores of office employees in different companies

That there should be wide differences in the mental alertness of groups of workers in the same occupation in different companies does not seem at all unexpected when we think of the pronounced influence that different labor policies must have upon the calibre of employees secured and retained by firms. The differences actually found among the women office employees of four companies are shown in figure 4. The significance of such differences is to be found in a consideration of the selective factors at work in the several companies. There is, for example, some evidence to indicate that the high score employees in company A tend to leak shortly after employment and that the reverse is true in company D.

A similar comparison for messenger boys is presented in figure 5, showing the distribution of mental alertness test scores of the office boys in three companies. The average score of the boys in company F is 36 points; in company E, 32 points; in company D, 26 points. The differences are clearly real and not chance differences. The significance of these facts for the individual companies is self-evident. The comparisons, moreover, bring out facts which no company alone could have detected. Test studies of this sort reveal symptoms; they must be followed by careful investigation to ascertain causes.

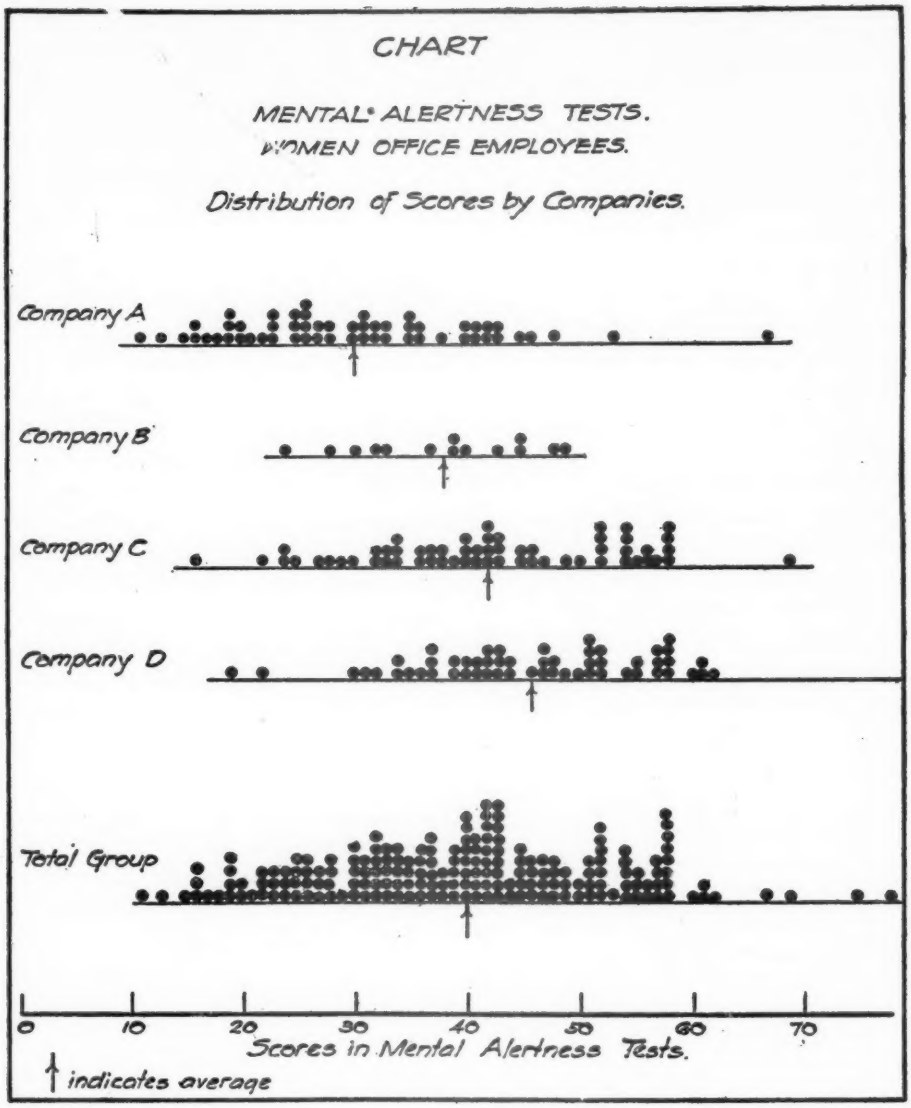


CHART
MENTAL ALERTNESS TESTS.
WOMEN OFFICE EMPLOYEES.
Distribution of Scores by Companies.
Company A
Company B
Company C
Company D
Total Group
0
10
20
30
40
50
60
70
Scores in Mental Alertness Tests.
indicates average

FIG. 4

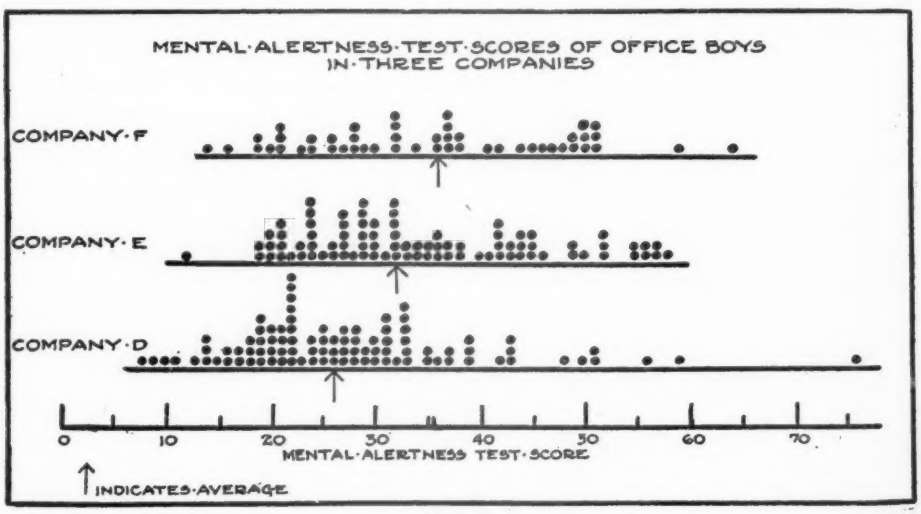

MENTAL ALERTNESS TEST SCORES OF OFFICE BOYS
IN THREE COMPANIES
COMPANY F
COMPANY E
COMPANY D
0
10
20
30
40
50
60
70
MENTAL ALERTNESS TEST SCORE
INDICATES AVERAGE

FIG. 5

Mental alertness test scores in relation to turnover among clerical workers

The relation between mental alertness test scores and turnover has been studied in two groups of clerical workers—a group of men in one company and a group of women in another company. A definite relation was found in both instances.

Figure 6 shows the relation of test scores to stability in the case of women clerks of company A and men clerks of company D. Each point on the curve indicates the per cent of employees making a given test score who had left the company within a period of six months from the time of employment. Thus, the curve for company A shows that about 40 per cent of the clerks hired who have a mental alertness test score between 15 and 30, leave within six months; the percentage decreases rapidly with the higher test scores, until the greatest stability is found among clerks scoring between 35 and 50. For clerks scoring more than 50, the percentage rises again rapidly until for those making the higher scores the instability is even greater than for those making the lower scores. The curve for company D is very different. As in company A, the turnover among employees making low scores is high. The percentage leaving drops sharply but, as the higher ranges of mental alertness are reached, there is a marked rise in turnover which is maintained over 15 points of the mental alertness scale. As the highest scores are reached, there is a pronounced increase in stability, a condition quite contrary to that of company A.

STABILITY IN RELATION TO MENTAL ALERTNESS TEST SCORE

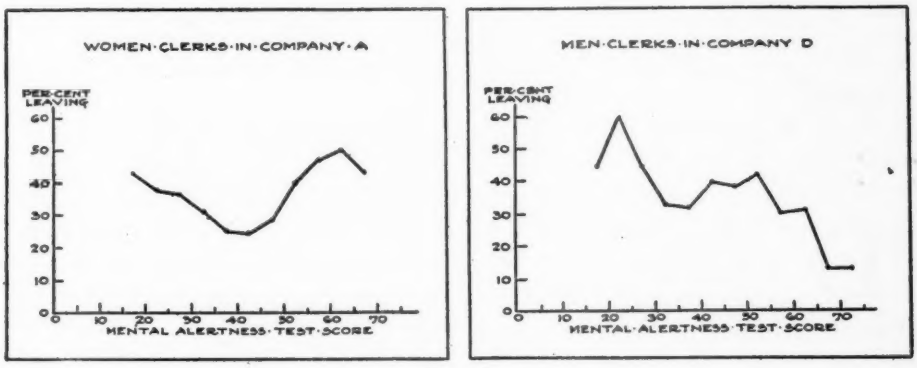


FIG. 6

Curves of this kind are useful in two directions. In the first place they call the attention of management to conditions that merit investigation in order to prevent the loss of desirable employees. It was found, for example, that in company D certain features of the wage policy were causing instability among the middle high employees. In the second place, studies of this sort give information that is useful in specifying mental alertness requirements for different occupations in terms of test scores.

Blond and Brunette Traits: A Quantitative Study

BY DONALD G. PATERSON AND KATHERINE E. LUDGATE, *University of Minnesota*

Summary.—Ratings from 94 intelligent and educated adults on 374 blonds and brunettes with respect to each of the 26 so-called blond and brunette traits championed by Dr. Katherine M. H. Blackford have been secured and analysed. The results show:

1. Brunettes were found to possess blond traits to the same extent that blonds do.
2. Blonds were found to possess brunette traits to the same extent that brunettes do.

From 1 and 2 above, it seems very probable that Dr. Blackford's law of color with her definite and dogmatic assertion concerning blond and brunette traits is not only misleading but false. The results also indicate the absence of any organized common belief concerning differences between blonds and brunettes in the 26 traits included in this study.

3. No significant sex differences were found either among the judges in making the ratings or among the 374 blonds and brunettes who were rated.

DR. KATHERINE M. H. BLACKFORD, in describing blond vs. brunette characteristics states: "In brief, always and everywhere, the normal blond has positive, dynamic, driving, aggressive, domineering, impatient, active, quick, hopeful, speculative, changeable and variety-loving characteristics; while the normal brunette has negative, static, conservative, imitative, submissive, cautious, painstaking, patient, plodding, slow, deliberate, serious, thoughtful, specializing characteristics."[1]

[1] Katherine M. H. Blackford, M.D., and Arthur Newcomb, "The Job, the Man, the Boss," p. 141, published by Doubleday, Page and Company, New York, 1919.

The generalization quoted above sums up the first one of the nine physical variables [(1) color, (2) form, (3) size, (4) structure, (5) texture, (6) consistency, (7) proportion, (8) expression, (9) condition], which constitute the fundamentals for the analysis of human character in the Blackford employment scheme.

Furthermore, Dr. Blackford assures us that her law of color is simple and straightforward. To quote: "In applying this law of color to people of the white race, the method is simple. The less the pigmentation in any individual, the more marked will be the characteristics of the blond in his physical, mental and psychical nature; the greater the degree of pigmentation,

the more marked the characteristics of the brunette."[2]

The above quotation give us the setting of the quantitative study here reported. It is assumed that the traits assigned to blonds and the traits assigned to brunettes will be interpreted uniformly by intelligent, educated adults. At least we must believe that Dr. Blackford makes this assumption for she does not consider it necessary to define or describe any of these traits. It is also assumed that intelligent, educated adults are capable of picking from among their acquaintances at least two pronounced blonds and two pronounced brunettes and that such adults are also capable of judging the existence or absence of each trait in a given individual. Such assumptions are reasonable enough in the light of Dr. Blackford's assurance that the method of applying the law of color is simple.

With these considerations before us, we should experience little difficulty in putting Dr. Blackford's generalization to the acid test. If blonds as a group, always and everywhere, possess or exhibit traits that are positive, dynamic, driving, etc. then blonds individually should possess such traits. And *if* blonds individually possess such traits then we should expect at least a large majority of them to be rated by intelligent, educated judges as being the possessors of those traits. On the other hand, intelligent, educated judges should rate the large majority of blonds as *deficient* in the brunette traits. The opposite results should hold, of course, in securing ratings on brunettes.

[2] Ibid., pp. 141–142.

METHOD OR PROCEDURE

The rating sheet. In order to secure ratings of blonds and brunettes by intelligent, educated adults we prepared the following form which was distributed to each of 94 judges. Each of these 94 judges was asked to pick out from among his acquaintances two pronounced blonds and two pronounced brunettes and to proceed to rate them with respect to each of the characteristics according to the directions given at the top of the rating sheet. The list of traits or characteristics was purposely arranged in a random order. That is, blond traits and brunette traits were thoroughly shuffled so that none of the judges would be able to tell from the order of the traits which were the blond traits and which were the brunette traits. None of the judges, so far as we are aware, had ever made any detailed study of Dr. Blackford's scheme of character analysis. Shuffling of the traits in the list was therefore probably effective in forestalling the effects of suggestion that might be present were the judges aware that certain traits are supposed to characterize blonds and certain other traits to characterize brunettes. In our opinion the 347 blond and brunette ratings are entirely free from prejudice for or against Dr. Blackford's blond vs. brunette analysis and they are also uninfluenced by any knowledge of the purpose prompting this study. Each judge was instructed to make out and submit his ratings independently.

The judges. The 94 judges who coöperated in making the ratings reported here were mature university students enrolled in a course in psychol-

Name..... Date.....

Directions: Select from among all the people you know *very well*, two who are pronounced blondes and two who are pronounced brunettes, and rate them with respect to the characteristics listed below. Put either a plus (+) or a minus (−) sign after *each characteristic* for each of the four persons you select for rating. If your first blonde is *positive*, put a plus sign after that characteristic, if not, put a minus sign and so on for the rest of the characteristics.

Hand in this paper with your ratings at the next lecture hour.

CHARACTERISTIC	1ST BLONDE Age..... Sex.....	1ST BRUNETTE Age..... Sex.....	2ND BLONDE Age..... Sex.....	2ND BRUNETTE Age..... Sex.....
Positive				
Dynamic				
Negative				
Static				
Conservative				
Driving				
Aggressive				
Domineering				
Imitative				
Impatient				
Submissive				
Active				
Quick				
Cautious				
Painstaking				
Hopeful				
Patient				
Plodding				
Slow				
Speculative				
Changeable				
Deliberate				
Serious				
Variety-loving				
Thoughtful				
Specializing				

ogy. These students belong to the brightest 50 per cent of students who enter the university. On an intelligence scale for the population at large these students would be rated as "superior" or "very superior" in intelligence. On such an intelligence scale these students would equal the brightest 10 per cent of the entire adult population of the United States. From the standpoint of educational status, these students would also rank exceptionally high, being more favored in the way of educational advantages than 96 per cent of the adult population. We are confident, therefore, that our judges are sufficiently intelligent and educated to apply Dr. Blackford's law of color with high degree of reliability and accuracy.

RESULTS

The ratings for blonds and brunettes were tabulated separately and the percentage of blonds rated plus (+) in each trait and the percentage of brunettes rated plus (+) in each trait was then computed. These computations are shown in Table I and are presented graphically in the accompanying chart. It is obvious that these so-called blond and brunette traits fail to differentiate real flesh and blood blonds and brunettes. On the contrary we find that the percentage of brunettes possessing the blond traits is fully as large as the percentage of blonds possessing blond traits. Furthermore the percentage of blonds possessing brunette traits is also very similar to the percentage of brunettes possessing brunette traits. These results are in flat contradiction to the results one has a right to expect if Dr. Blackford's generalization is true. The bar diagrams, shown on the chart, for blonds and brunettes are very similar from trait to trait, the divergences between the length of the bars being conspicuous because of their absence. The similarity is very close as shown by a correlation of + 0.96.[3] It is probable that such small divergences as are found here would disappear if the bar diagrams were based on ratings of 1000 blonds and 1000 brunettes instead of on the basis of 187 blonds and 187 brunettes.

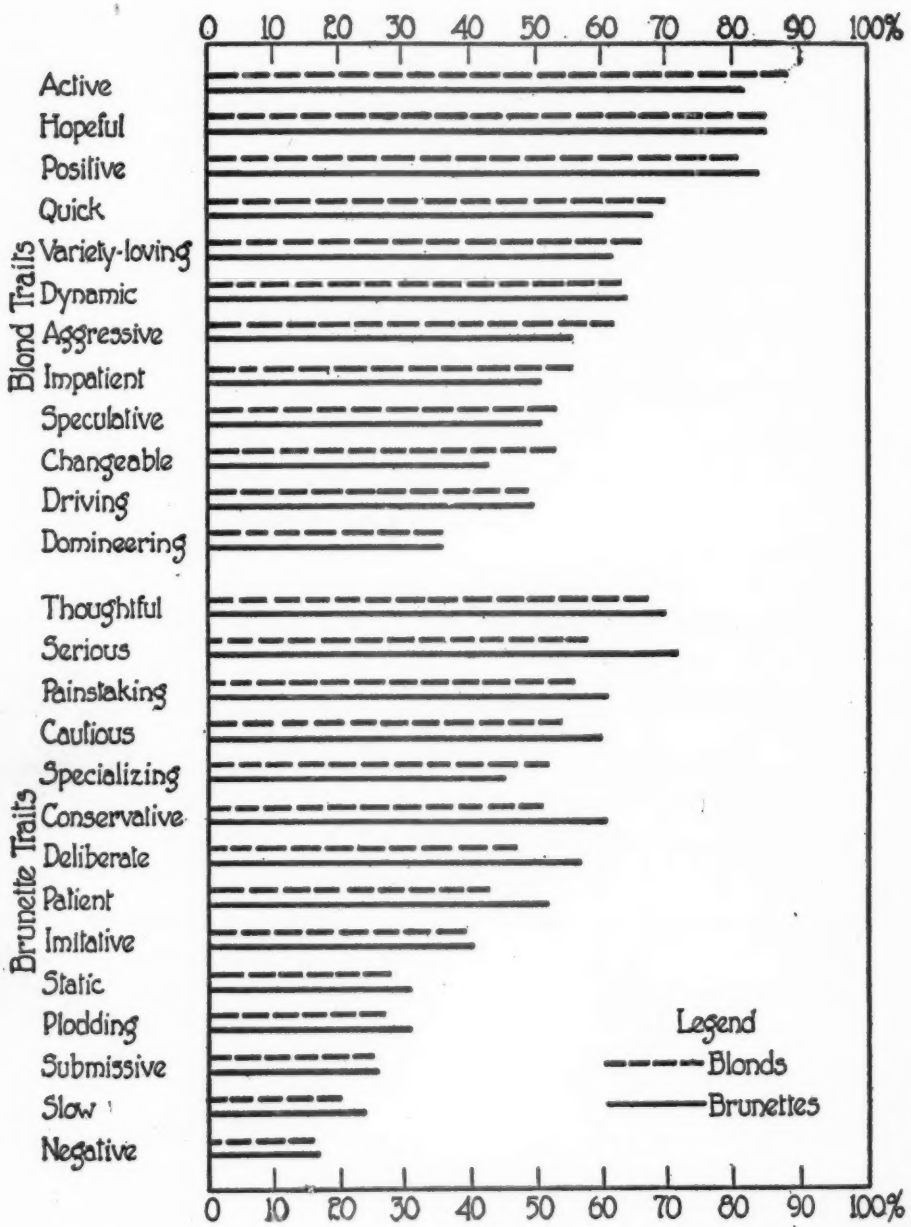
TABLE 1

Percentage of blonds and brunettes rated plus in each trait

	PERCENTAGE RATED PLUS (+)	
	187 Blonds	187 Brunettes
Blond traits:		
Positive	81	84
Dynamic	63	64
Driving	49	50
Aggressive	62	56
Domineering	36	36
Impatient	56	51
Active	88	82
Quick	70	68
Hopeful	85	85
Speculative	53	51
Changeable	53	43
Variety-loving	66	62
Brunette traits:		
Negative	16	17
Static	28	31
Conservative	51	61
Imitative	39	40
Submissive	25	26
Cautious	54	60
Painstaking	56	61
Patient	43	52
Plodding	27	31
Slow	20	24
Deliberate	47	57
Serious	58	72
Thoughtful	67	70
Specializing	52	45

It is reasonable to suppose that marked differences might have been disclosed even though Dr. Blackford's grouping of the traits was incorrect. Even though no real differences exist between blonds and brunettes in such traits, still it is possible that common beliefs concerning blonds as contrasted with brunettes might exist in which case our curves might be quite divergent. The similarity of the blond and brunette curves seems to show that there are no marked differences between blonds and brunettes in these traits and further that there is no

[3] Pearson Coefficient of Correlation, $r = \frac{\Sigma x.y}{\sqrt{\Sigma x^2 . \Sigma y^2}}$



Bar diagram showing percentage of blonds and brunettes rated plus in each trait. Based on data in table 1 with arrangement of traits in a descending order of magnitude of percentages.

organized or systematized common belief concerning difference between blonds and brunettes. If such a common belief does exist, the traits listed by Dr. Blackford fail to disclose it.

Sex differences. A word is in order concerning an analysis of the ratings from the standpoint of (1) the sex of the judges and (2) the sex of those rated.

In brief it may be said that no significant sex differences were disclosed. In terms of correlations the results are:[4]

(1) Sex of judges

Correlation between male and female judges rating male blonds.....+0.88

Correlation between male and female judges rating male brunettes.....+0.82

Correlation between male and female judges rating female blonds.....+0.82

Correlation between male and female judges rating female brunettes.....+0.93

These correlations are very high and indicate that three is little difference between the ratings made by male and female judges in rating either male or female blonds or brunettes.

(2) Sex of those rated

Correlation between male blonds and female blonds rated by judges of both sexes.....+0.87

Correlation between male brunettes and female brunettes rated by judges of both sexes..+0.91

These correlations are also very high indicating the lack of any significant sex difference among blonds and brunettes with respect to the possession of the traits listed by Dr. Blackford.

[4] In each comparison the correlation is based on the differences between the rank orders of the list of traits for one group and the rank order of the list of traits for another group. The traits were arranged in a rank order on the basis of the percentage rated plus in each trait. Spearman's Rank Difference Correlation, $P = 1 - n\frac{6 \Sigma d^2}{(n^2-1)}$ used in computing correlations.

News Notes

THE NEW BUREAU OF PUBLIC PERSONNEL ADMINISTRATION WITHIN THE INSTITUTE OF GOVERNMENT RESEARCH

Plans for a Bureau of Public Personnel Administration were formulated early in April. At the suggestion of Beardsley Ruml of the Personnel Research Federation a memorandum of these plans was prepared by Dr. Lewis Meriam of the Institute of Government Research. A conference with the Division of Anthropology and Psychology of the National Research Council was held on April 27 to discuss the problems involved. The United States Civil Service Commission was represented by Delos Walker, member at large; Herbert A. Filer, chief examiner; members of state municipal and voluntary civil service organizations present were Guy Moffet and C. C. Hathaway; Charles S. Shaughnessy, chief examiner for Philadelphia; Albert Smith Faught, a member of the council of the National Civil Service Reform League and secretary of the Pennsylvania Civil Service Reform Association, who spoke for the joint committee on the Bureau of Civil Service methods; William C. Beyer, assistant director of the Bureau of Municipal Research of Philadelphia and chairman of the committee on civil service of the Governmental Research Conference of the United States and Canada. National Research Council representatives present included C. E. Seashore, chairman; H. C. Bingham, J. McKeen Cattell, A. L. Kroeber, H. C. Warren, G. M. Whipple, R. M. Yerkes, and C. S. Yoakum.

The conference was quite informal in nature. The discussion covered first the procedure now in force in civil service examining and existing tests which might be of service in addition to or instead of those employed at present. It then turned to the possibilities of the organization under discussion. The advantages proposed were a clearing house for information on the work of civil service commissions which would be of importance both to those inside and those outside of the federal service, and an opportunity for coöperation between the people in charge of the big production job of civil service examining which must be done immediately and the psychologists who have the facilities for showing how this work could be better done and are equipped to undertake research work that may not produce detailed practical results for many years.

Those present felt that the organization in question could be developed to advantage in connection with some existing organization rather than independently. After a discussion of the various possibilities, the following motion was adopted:

"That this Conference endorse the movement establishing a Bureau of Civil Service Methods, working in coöperation with the National Assembly of Civil Service Commissions, the National Institute of Government Research, the National Civil Service Reform League and other interested organizations, the activities of which would be (1) to establish a clearing house of information (2) to make a study of the technique of examination, including the application of psychological principles, (3) to study the business practice and procedure of civil service commissions, and (4) other kindred topics."

A second conference was called on May 22 for the purpose of organizing the Bureau. The members present were: C. E. Seashore, chairman. Chairman of Division of Anthropology and Psychology; Raymond Dodge, Chairman-elect of the Division of Anthropology and Psychology; Albert Smith Faught, Member of Council of National Civil Service Reform League; William Gorham Rice, Representative of

National Assembly of Civil Service Commissions; Lewis Meriam, Representative of the Institute for Government Research; Beardsley Ruml, Representative of Personnel Research Federation; G. R. Wales, United States Civil Service Commissioner; R. M. Yerkes, Chairman, Research Information Service.

At this conference, the name of "The Bureau of Public Personnel Administration" was adopted and the Institute of Government Research designated as the organization which should be requested to undertake the administration of this Bureau. The functions of the Bureau were outlined thus:

1. To serve as a clearing house for existing information regarding matters relating to personnel administration in the public service, national, state, county and local.

2. To develop or improve methods of personnel administration through the conduct of original investigations and experiments.

3. To publish the results of the work in such form as experience may demonstrate is most effective for the improvement of the personnel administration of the public service.

The project was formally endorsed by the National Research Council at a meeting of the Interim Committee on June 6.

NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY

At a recent meeting of the National Institute of Industrial Psychology (London), Dr. C. S. Myers, a leading exponent of applied psychology in England, who has resigned his Fellowship and appointments at Cambridge University in order to devote himself wholly to the objects of the institute, of which he is a director, moved the following resolution:

In view of the present serious economic situation and of the necessity to reduce costs of production and to increase the total national output, this meeting is of the opinion that: (*a*) A more complete and scientific development of the nation's human resources and a reduction of wasteful and misapplied energy are matters of urgent national importance; (*b*) the methods adopted by the National Institute of Industrial Psychology have been shown to reduce costs of production, to promote the development and individual ability, to eliminate unnecessary effort and fatigue, and to improve the health and well being of the worker; (*c*) it is imperative that a national fund should be immediately established to enable the institute to extend its sphere of usefulness and to continue the necessary researches into the scientific problems involved.

Viscount Haldane, who supported the resolution, said there was no problem more menacing than that of unrest arising out of the relations of Labor to Capital. That sense of unrest was not at all inevitable, and it could be enormously reduced if taken in the right way. He was not one of the group, comprising political friends of his own, who were filled with the fear of Bolshevism in this country. He mixed a good deal with our democracy and his misgiving was that it was rather too inert; that it was rather too difficult to stir about its own real concerns. Any tendancy to Bolshevism was the tendancy of a minority, which he believed was so small that it was not likely to exercise any predominant influence in the politics of the future. Though he did not dread revolution, there was another thing which he did dread and that was the fact of the sense of discontent arising from much that was legitimately regarded as a source of discontent. That it was which more than anything else contrived to keep Labor and Capital apart, and for his part he wished to see them come more nearly together. We lived in a remarkable century. Inventions, new ideas, were everywhere transforming knowledge, and profoundly influencing the organization of society. We had to see to these. We were very apt to neglect things, not from any want of goodwill, but simply because we did not know. It was through want of knowledge, not foresight, that people did not make reforms that were vital.

Going up and down the country in the cause of getting higher education brought through the universities to the doors of the working-classes, he found the latter

very keen about it. But we were face to face with the extraordinary fact that in our population not one in ten even today got any systematic education after leaving the elementary school. What was the result of that? The workman bitterly complained; he was not always inert. A navvy came and spoke to him recently who, out of his low wages, contrived to send four of his nine children to the secondary school. That was not uncommon. The desire for a larger outlook was springing up among the working people. It did not cause them to look down on their manual work, rather their work had for them a new interest and significance if only they could get that leisure in which they could extend their own souls. But it was hopeless in the case of a man or woman coming home tired out after a day's work to expect them to gain that spiritual refreshment and knowledge which made the whole difference to their lives. Those who gained the larger outlook were less likely to get rashly into industrial disputes and more likely to find work interesting and be keen about it. We had reached a stage where more and more the mere mechanical work was being done by the machine—electricity would make a still greater revolution in this direction—and manual labor was getting to be more and more the directing of the machine. In other words, mind was coming into the business. Mind was a very important thing. It was not capital that created wealth, nor labor, but mind. One of the objects of the institute was, as far as possible, to relieve labor from the sense that men and women were only machines. Their aim was not to get the utmost out of the individual without regard to the individual's own concern.

He looked forward to the time when we should have got out of our heads the notion that there was a gulf fixed between the man who worked with his head and the man who worked with his hands. Much head work was very mechanical. Psychology was a new science which had come into industry. We were on the eve of realizing that the workman was not a machine, but had to be watched and studied in the same way, and he imagined that within twenty years the expert would be the elbow of every manager of a great business. If this were done we should have taken a step towards securing the contentment of the workers, because they would be able to turn to those things that raised the soul and gave them the full meaning of life.

The resolution was carried unanimously.

Mr. Julius Salmon, proposing a vote of thanks to Lord Haldane, and to the Lord Mayor for granting the Institute the use of the Mansion House spoke of the great value the psychologist had been to his own company (Messrs. Lyons and Company). They employed, he said, 20,000 people, and, in regard to the manual workers, remarkable results had been achieved by the application of a practical knowledge of psychology. They had been shown how to handle their goods to the best advantage by the same staff, so that with less physical effort on the part of that staff, they had been able to handle 30 per cent to 35 per cent more goods. An investigation was now being carried out under the aegis of the institute in regard to the domestic workers—waitresses, kitchen women, etc.—and his firm felt that there was a great field here, where the waste from breakages alone was enormous. He and his co-directors had every reason to be pleased and satisfied with their experience of the work carried out by the insitutute on their behalf.

Sir Robert Witt seconded, and the resolution was carried with acclamation.

Among those present were: Lord Asquith Colonel O. C. Armstrong (President of the Federation of British Industries), Sir Robett Blair, Mr. Cyril Burt, Dr. J. Drever, Sir Walter Fletcher, M.D., Sir Charles Higham, M.P., Sir Alfred Keogh, M.D., Mr. A. F. Lake, J.P., Mr. Kenneth Lee, Dr. B. A. McSwiney, Mr. Stanley Machin (President of the London Chamber of Commerce), Mr. J. J. Mallon, Mr. C. D. Seligman, Sir C. S. Sherrington, M.D. (President of the Royal Society), Sir Richard Vassar-Smith, Dr. C. S. Spearman, Mr. C. Tennyson, Dr. G. H. Thomson, Miss Gertrude Tuckwell, Dr. R. M. Wilson.

STANDARDIZATION OF INDUSTRIAL ACCIDENT STATISTICS

No department of statistical inquiry more closely touches the public weal than the study of personal injuries by accident. Statistics of industrial accidents should serve for accident prevention, for the due administration and intelligent revision of workmen's compensation laws, and for the computation of compensation insurance rates. For accident prevention it is needful to know how and why accidents occur. For the better administration of workmen's compensation laws it is necessary to have accurate statistical record of the disposal of compensation cases—not only the comparatively few cases which are formally passed upon by the administrative board but the immensely larger number of claims which are settled between the parties with only a pro forma administrative approval. For the intelligent enactment and revision of compensation legislation legislators must know the number and character of accidental injuries, the extent of wage loss, and the cost in per cent of payroll of any proposed scale of benefits. Lastly, for the computation of insurance rates it is necessary to have not only the actual pure premiums by industries but a detailed analysis of the accidents which occasion the pure premiums. To serve these ends, accident statistics must be analyzed by industry, by cause of accident, and by nature and location of injury and extent of disability, and must be so cross analyzed as to show the correlation of each of these sets of facts with every other.

Up to recently the official industrial accident statistics of the United States have been lamentably weak in just these particulars. Practically none of the States had published statistics that were at all adequate to its own needs, and no two States have produced results that were in any way comparable. The practical difficulties of making comparisons of the accident statistics of the various States and countries made the subject of uniform accident reporting and standard methods of tabulation and analysis one of serious concern to those interested in workmen's compensation administration.

A standing committee on statistics and compensation insurance cost was created in 1915 by the International Association of Industrial Accident Boards and Commissions which had been organized the previous year. The purpose of this committee was to formulate a plan for standardizing forms and methods of reporting and tabulating accident statistics. This committee is composed of statisticians and actuaries of the United States Bureau of Labor Statistics and State Compensation Commissions. Thus far the committee has made six reports dealing with standardization of industrial accident statistics and compensation costs. These reports have been combined into one and published by the United States Bureau of Labor Statistics and Bulletin no. 276.

The scope and accomplishments of the committee are indicated by the following subjects:

1. Standardization of definitions and accident reporting forms and practices.
2. Classification of industries according to the nature of the business.
3. Classification of the causes of accidents.
4. Classification of accident by location and nature of injury and extent of disability.
5. Formulation of standard tables for the presentation of accident statistics.
6. Determination of a proper base for the computation of accident rates.
7. Formulation of a standard scale of weights designed to express the severity of accidental injuries in terms of time loss.
8. Determination of a standard method for computing compensation insurance costs.

The classifications are not presented as perfect or the embodiment of all wisdom. They are necessarily the result of compromise. The committee had to consider, on the one hand, the requirements of scientific classification, and, on the other hand, the limitations of time and means at the disposal of administrative boards. Due regard for these limitations enforced the omission of much detail which may be within the reach of some favored states and which is very desirable for certain purposes.

The committee devoted much time to the consideration of proper methods for computing accurate frequency and severity accident rates. The first essential was the determination of a uniform base of measurement. The first base adopted was 300 full-time workers, but this was changed later to 1000 hours; that is accident rates should be stated in terms of 1000 working hours. By this method an accurate measure of accident occurrence or frequency may be obtained. The true measure of hazard in an industry, however, is not given by the mere number of accidents of all kinds per 1000 hours' exposure. The severity of the accidents must also be taken into account. To illustrate, the fatality rate in mining and logging is much greater than it is in manufacturing. Consequently the accident frequency rates for these industries do not express the true hazard. To overcome this difficulty the committee devised a method of weighting accidents so as to show their relative severity. All accidents were reduced to a common denominator, namely, time loss. Fatalities and permanent total disabilities are each valued at 6000 working days. The values given to permanent partial disabilities range from 4500 days for the loss of an arm to 300 days for the loss of a finger or toe. All accidents are therefore reduced to a time loss basis and the accident severity rates are stated in terms of number of days lost per 1000 or 1,000,000 hours of exposure.

The standard classifications formulated by the committee have been quite generally adopted by the compensation commissions, casualty insurance carriers, and industrial statisticians in the United States.

SAN FRANCISCO BUREAU OF MANAGEMENT RESEARCH

This Bureau started three years ago as the Pacific Coast Bureau of Employment Research. Its name was recently changed because of the new scope and emphasis of its work. It is devoted now to "the solution of management problems, particularly those having to do with the human element in business and industry." Practically all of its work is done for individual corporations, and the results are not published. However, it has aimed from the beginning to promote coöperative community efforts along the line of improved personnel management. This was done at first through the Personnel Club, which was later merged with the Industrial Relations Association of California, whose offices are maintained in connection with those of this Bureau.

The Industrial Relations Association of California maintains separate sections for managerial executives, employment or personnel managers, foremen, and public representatives who are interested in industrial relations. It issues a monthly periodical, the Industrial Relations Exchange for the benefit of members. Also maintains extensive information service files and field service to members, and carries on surveys of general interest. It keeps the newspapers and public bodies supplied with publicity and educational material calculated to improve the tone of the community from the standpoint of intelligent labor control.

Last year the Bureau of Management Research accomplished the unusual feat of examining nearly twelve hundred candidates for city positions, in eighteen different subjects, in the same room, in an hour and thirteen minutes, and without a word of oral instruction. This was a general clerk's examination. A number of smaller examinations have since been given in the same way to conductors, motormen, jailers, stenographers, telephone operators, policemen, firemen, etc., but this summer the idea will be carried a step further and more than twenty different trade examinations will be given by the silent method in the same room and at the same time. Under the method devised, some candidates have even taken three different examinations alongside others who were taking only one or two and the whole job was finished in an hour without anyone's leaving the examination hall. Lieut. Chas. C. Stech has been largely responsible for this work.

THE INTER-COMPANY SAFETY CONFERENCE

An interesting meeting of the Inter-Company Safety Conference was held in the Edison Building, Chicago, April 20,

1922. The Appliance Committee reported on fire extinguishers (special reports on the Nu-Ex Extinguisher and Foamite), Shur-loc elevator stops, Super-switch safety cars, rubber gloves, and an Oxygen Inhalator. The chairman, C. B. Scott, brought out the fact that, aside from acting on reports, the business of this meeting was to consider the subject of "The weakest point in our practiced plans of accident prevention and how to overcome it." After a discussion on this subject the committee voted to concentrate its activities on the following points: (1) The necessity for closer coöperation between the safety and engineering departments; (2) importance of promptly carrying out recommendations which have been approved; (3) The necessity of, and the proper kind of, "follow up system," in all work and particularly in the handling of meritorious recommendations.

JOINT BOARD OF SANITARY CONTROL

The eleventh annual report of the Joint Board of Sanitary Control is dated 1922. This Board represents the employers, the workers, and the public concerned in the cloak, suit and skirt, and dress and waist trades in New York City. It has jurisdiction over 3800 factories and approximately 85,000 workers. The special health clinics were fostered at first by the Board but later passed directly to the workers and are supported entirely by them as the Union Health Center. In 1921, they treated 15,000 patients. The report discusses in summaries the progress in fire protection, seating and posture, ventilation, illumination, sanitation, and building inspection. Health education is carried on continually by means of literature, shop talks, schools, special health nights, and the Question Box. In a general foreword, the Secretary, Dr. Henry Moskowitz says:

"The Joint Board of Sanitary Control has become an integral part of the industry. It is regarded by the public as a means of protecting the consumer against unsanitary conditions in the industry. Through its campaign of education among the employers and the rank and file of the workers, the latter have always looked upon this institution as guarding their interests. Enlightened employers have given their unstinting support to the work of the Board so that, after the expiration of eleven years, this institution has been so tried and tested that neither the workers nor the employers can conceive of the industry without the existence of the Board."

As the Board grapples with these problems, new possibilities are opened up, not only for industrial self control but for health control in which the collective instrument of the workers' organization becomes more and more constructively useful to the workers themselves, not only from the standpoint of raising their economic standards but of their health standards as well.

On the other hand, the employers learn to appreciate the importance of selling to the consumer a garment made under sanitary conditions, which protect the consuming public from conditions it cannot control.

The Joint Board of Sanitary Control represents the fruit of true industrial democracy, in which the employer, the workers and the public are properly represented.

BUREAU OF MUNICIPAL RESEARCH

The Bureau of Municipal Research of New York City has just published an outline of the chief causes of the present difficulties in city administration due to the fact that taxation though high is not sufficient to cover the expenditure necessary for the desired public improvement. During the past fifteen years the Municipal Bureau has furnished consulting service on problems of administration to more than two hundred cities in the United States and Canada.

THE NATIONAL INSTITUTE OF PUBLIC ADMINISTRATION

The National Institute of Public Administration, has been organized in New York City for the purpose of training men and women in the practical work of public administration. Training will be given to college graduates or others of equal experience along the lines of Budget Making,

Personnel Administration, Public Accounting, Public Debt, Police, and Fire Administration, Educational Administration, etc. A detailed account of these courses together with advice as to the choice of courses for persons desiring to attend the Institute at a later date is given in the 1922–1923 catalog.

DEFINITION OF THE PHYSICIAN IN INDUSTRY

At a recent meeting of the Conference Board of Physicians in Industry,[1] the following definition of the Physician in Industry was adopted.

"The physician in industry is one who applies the principles of modern medicine and surgery to the industrial worker, sick or well, supplementing the remedial agencies of medicine by the sound application of hygiene, sanitation and accident prevention; and who, in addition, has an adequate and coöperative appreciation of the social, economic and administrative problems and responsibilities of industry in its relation to society."

The discussion leading up to the formulation of this defintion extended over several months. The question was viewed from all angles and many suggestions were considered for including in the definition an outline of what his duties and functions were.

It was felt, however, that in order to avoid a complicated statement it would be better to include in a definition only the broad fundamental principles upon which the work of the physician in industry is based, leaving to subsequent elaboration the finer details. It was pointed out that the definition adopted should emphasize both the medical attainments and the industrial requirements of the physician engaged in this work in order to make his duties clear both to the medical profession and to industrial management.

It is assumed that the physician engaged in industrial work is well grounded in the fundamentals of medicine and surgery. He is, first of all, a physician. It is obvious, however, that this alone, while equipping him for satisfactory service in private practice, does not meet fully the requirements of industrial work. In his industrial experience he has, of necessity, to deal with questions of sanitation, hygiene, and accident prevention as applied to large numbers of people working in comparatively close association. Only by special knowledge of the work in hand will the physician be able satisfactorily to discharge his duties. His knowledge of plant processes together with the physical examination of applicants for employment and of workers already engaged will enable him by judicious placement to reduce materially the accident and morbidity hazard and rate.

It must be realized that many of the qualifications for successful medical work in industry are of a non-medical nature, and call for a knowledge of the laws of social and industrial economics and of the administrative problems which arise in the conduct of an industrial medical department. The physician in industry must have a clear conception of the responsibilities of the industry to its workers and through them collectively to the community. On the other hand he should recognize clearly the duties of workers to the industry in which they are engaged. It is an intelligent appreciation and consideration of these problems that make for the success of the work of the physician in industry.

It is hoped that this definition will tend to remove misconceptions as to the work of the physician in industry, and establish his position and his work upon a basis satisfactory alike to the physician and to the industrial organization.

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[1] Membership of the Conference Board of Physicians in Industry is as follows:

Dr. JOHN J. MOOREHEAD, *Chairman*
Dr. W. IRVING CLARK, *Vice Chairman*
MAGNUS W. ALEXANDER, *Treasurer*
Dr. F. L. RECTOR, *Secretary*, 10 East 39th St., New York

Members

Dr. E. B. ALLEN, Cheney Bros., South Manchester, Conn.
Dr. T. JOHN BOWES, Philadelphia Electric Co., Philadelphia, Pa.
Dr. W. IRVING CLARK, Norton Company, Worchester, Mass.

Dr. Royal S. Copeland, Health Commissioner, New York
Dr. R. P. Cummins, Midvale Steel Co., Philadelphia, Pa.
Dr. Wm. J. Curry, American Thread Co., Holyoke, Mass.
Dr. W. B. Fisk, International Harvester Co., Chicago, Ill.
Dr. C. E. Ford, General Chemical Co., New York
Dr. Otto P. Geier, Cincinnati Milling Machine Co., Cincinnati, Ohio
Dr. E. H. Hanna, Cadillac Motor Car Co., Detroit, Mich.
Dr. T. L. Hazlett, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Dr. E. H. Ingram, Wm. Cramp & Sons Co., Philadelphia, Pa.
Dr. J. A. Jackson, New York Edison Co., New York
Dr. A. C. Marshall, Powers-Weightman-Rosengarten Co., Philadelphia, Pa.
Dr. S. M. McCurdy, Youngstown Sheet and Tube Co., Youngstown, Ohio
Dr. J. D. McGowan, Commonwealth Edison Co., Chicago, Ill.
Dr. John J. Moorehead, Professor of Surgery, Post Graduate Med. School and Hospital, New York
Dr. Voyle A. Paul, The Yale & Towne Mfg. Co., Stamford, Conn.
Dr. R. S. Quinby, Hood Rubber Co., Watertown, Mass.
Dr. W. E. Ramsay, Raritan Copper Works, Perth Amboy, N. J.
Dr. Wm. Alfred Sawyer, Eastman Kodak Co., Rochester, N. Y.
Dr. F. E. Schubmehl, General Electric Co., West Lynn, Mass.
Dr. Loyal A. Shoudy, Bethlehem Steel Co., Bethlehem, Pa.
Dr. A. K. Smith, E. I. duPont de Nemours & Co., Wilmington, Del.
Dr. Paul Traub, John Roebling's Sons & Co., Roebling, N. J.
Dr. C. H. Watson, Amer. Telephone & Telegraph Co., New York
Dr. John Woodman, United Elec. Light and Power Co., New York
Dr. C. C. Burlingame, 17 East 42d St., New York
Dr. C. A. Lauffer, 521 Franklin Ave., Wilkinsburg, Pa.

Book Reviews

HUMAN NATURE AND CONDUCT

By John Dewey. Henry Holt and Company, 1922. vi + 336 pp.

REVIEWED BY C. S. YOAKUM

This book includes, in largely expanded and rewritten form, the series of three lectures delivered on the West Memorial Foundation at Leland Stanford Jr. University in the spring of 1918. In many respects it is the most interesting book that Mr. Dewey has written, dealing as it does directly and concretely with the actions and motives of men. In his preface, Mr. Dewey says the book "seriously sets forth a belief that habit combines in itself biological factors and social conditions, and that an understanding of habit and of different types of habit is the key to social psychology. The operation of impulse and intelligence gives the key to individualized mental activity. But the proposition set forth is that they are secondary to habit, so that the individual mind can be understood in the concrete only as a system of beliefs, desires and purposes which are formed in the interaction of biological aptitudes with the environment."

The book is divided into four parts: The place of habit in conduct; The place of impulse in conduct; The place of intelligence in conduct; and a conclusion in which Dr. Dewey discusses the social nature of moral problems.

To those of us who have listened in recent years to the extreme statements made regarding instinct and the strictly biological bases of human action, extreme statements made in an effort to explain fully by these means the behavior and motives of men at work and play, a careful perusal of the book will again emphasize for us the important part that social forces play in making groups and individuals what they are.

The theme around which the discussion is built is morality. "Morality is largely concerned with controlling human nature. When we are attempting to control anything we are acutely aware of what resists us. . . . (Moral) control has been vested in an oligarchy. Indifference to regulation has grown in the gap which separates the ruled from the rulers. . . . Everybody knows that good children are those who make as little trouble as possible for their elders, and since most of them cause a good deal of annoyance they must be naughty by nature. Generally speaking, good people have been those who did what they were told to do, and lack of eager compliance is a sign of something wrong in their nature." (pp. 1–3) The most noticeable result of this attitude has been the development of a system of negative morality. According to the various types of temperament, they develop certain forms of negative morals. The commonest form is a neutral respectability. "Blame is most readily averted by being so much like everybody else that one passes unnoticed." But "There are always ruder forceful natures who cannot tame themselves to the required level of colorless conformity. To them conventional morality appears as an organized futility; though they are usually unconscious of their own attitude since they are heartily in favor of morality for the mass as making it easier to manage them. Their only standard is success, putting things

over, getting things done." Another group lacks "the persistent force of the executive will to break through conventions and to use them for their own purposes, but . . . unite sensitiveness with intensity of desire . . . . they hold that all mortality is a conventionality hampering to the development of individuality." If we turn from the effects of the separation of morals from other actions to the general human struggle, we find two schools of social reform. One "asserts that the only way to change institutions is for men to purify their own hearts, and that when this is accomplished, change of institutions will follow of itself." The other says "that men are made what they are by the forces of the environment, that human nature is purely malleable, and that till institutions are changed, nothing can be done." But there is an alternative. "All conduct is *interaction* between elements of human nature and the environment, natural and social. . . . When we look at the problem as one of an adjustment to be intelligently attained, the issue shifts from within personality to an engineering issue, the establishment of arts of education and social guidance" (p. 10).

"Habits are arts. They involve skill of sensory and motor organs, cunning or craft, and objective materials. They assimilate objective energies, and eventuate in command of environment. They require order, discipline, and manifest technique. They have a beginning, middle and end. Each stage marks progress in dealing with materials and tools, advance in converting material to active use. We should laugh at anyone who said that he was a master of stone-working, but that the art was cooped up within himself and in no wise dependent upon support from objects and assistance from tools. In morals we are, however, quite accustomed to such a fatuity. Moral dispositions are thought of as belonging exclusively to a self. The self is thereby isolated from natural and social surroundings" (p. 15). When not thinking of the theories, but working practically we recognize the part played by social factors in generating personal traits. One evidence is "our habit of making social classifications. We attribute distinctive characteristics to rich and poor, slum-dweller and captain of industry, rustic and suburbanite, officials, politicians, professors, to members of races, sets and parties. . . . (These judgments) show our practical awareness that personal traits are functions of social situations. . . . We cannot change habit directly: that notion is magic. But we can change it indirectly by modifying conditions, by an intelligent selecting and weighing of the objects which engage attention and which influence the fulfilment of desires."

Even thinking cannot escape the influence of habit. Since thinking (intelligent selection) is both influenced by, and a means of influencing, habit, "Thought which does not exist within ordinary habits of action lacks means of execution."

"Practical men" combine thought and action. "Those who wish a monopoly (p. 72) of social power find desirable the separation of habit and thought, action and soul, so characteristic of history. For the dualism enables them to do the thinking and planning, while others remain the docile, even if awkward, instruments of execution. Until this scheme is changed, democracy is bound to be perverted in realization. With our present system of education—by which something more extensive than schooling is meant—democracy multiplies occasions for imitation, not occasions for thought in action." This process deifies some particular custom. Segregated classes develop their own customs, their own working morals. In times of social flux, the settled distribution of customs is disturbed. "Today such a conflict occurs between propertied classes and those who depend upon daily wage; between men and women; between old and young. Each appeals to its own standard of right, and each thinks the other the creature of personal desire, whim or obstinacy. . . . . The demand of each side treats its opponent as a wilful violator of moral principles, an expression of self-interest or superior might" (p. 83).

The solution lies in foresight and thoughtful application of planning to the readjustment of codes. In business as in

social customs we are too apt to understand the remedies after the error has been committed. Dr. Ayres in a recent article calls attention to the duties of the business statistician as predicting the future from a study of present and past statistics. Actually he finds the business statistican is concerned primarily with clerical work on figures and seldom if ever is in a position to effect a change in the management of business. So Dr. Dewey says, "Intelligence which is the only possible messenger of reconciliation, dwells in a far land of abstractions or comes after the event to record accomplished facts." The separation of thinking and habits is no less apparent in the personal relations of men than in their business planning.

Habits come first in the significance of human relations. Man is not like animals in this respect. For animals, the usefulness of instincts is largely present and immediate. Man could not live in his present environment merely by the use of his inherited tendencies. He only becomes a self-sustaining member of the social group when he has gone through a long period of habit formation and has learned how to comport himself in the various human activities. The stock of inherited impulses is much the same for all peoples, but the customs and behaviors differ widely from nation to nation and between races. So numerous are the possibilities in the young that any set of social customs may be imposed upon them. It is regrettable that with all this potentiality of development we are satisfied with impressing upon them the old customs and ideas. Though we feel that youth is the time for learning, so rigid is the demand of conformity that little is learned beyond the things that our fathers did. Here we see how little influence the reflective powers have on the readjustment of society, and how strong are the habits that we must learn in order to enter society. Outside of social upheavals, the only method of reconstructing social and industrial relations lies in the application of intelligent direction to the formation of different and more suitable habits. The numerous impulses that man has are rich soil for the growth of these new habits. Different behavior cannot depend on the native stock of responses. Industrial urest cannot be allayed by attempting to change instincts or original nature. Industrial unrest, youth, and periods of social flux are those periods when the application of intelligence can most hopefully expect to produce better adjustments and more usable habits in human relations. Instead, we are too dependent on war, revolution, death of individuals and death of nations for the release of society from the rigid habits that are causing unrest and clashes between different ideals.

"Wary, experienced men of the world have always been sceptical of schemes of unlimited improvement." The conservative rests his case on the unchangeableness of human nature the radical takes his cue from a belief in the easy and rapid change that is possible in the formation of habit. As a matter of fact, the reverse of this is true. Habits are rigid; impulse and instinct in man are fluid. "To Aristotle slavery was rooted in aboriginal human nature. The traditional motives of war no longer operate" (p. 112 f.). Work that originally served as an outlet for all the activities of the individual has become, under the development of social habits, labor, that which, in economic theory is "something painful, something so onerously disagreeable, or 'costly' that every individual avoids it if he can, and engages in it only because of the promise of an overbalancing gain."—"It is 'natural' for activity to be agreeable. It tends to find fulfilment, and finding an outlet is itself satisfactory, for it marks partial accomplishment. If productive activity has become so inherently unsatisfactory that men have to be artificially induced to engage in it, this fact is ample proof that the conditions under which work is carried on balk the complex of activities instead of promoting them, irritate and frustrate natural tendencies instead of carrying them forward to fruition. . . . A real and important fact is thus contained in current economic psychology, but it is a fact about existing industrial conditions and not a fact about native, original activity."

"What is necessary is that habits be formed which are more intelligent, more sensitively percipient, more informed with foresight, more aware of what they are about, more direct and sincere, more flexibly responsive than those now current. Then they will meet their own problems and propose their own improvements." Educative development of the young, the wearing of one habit on another, increase of the creative phase of human activities, are suggested as the means by which habit and custom become more subservient to the needs of human nature. "The first step in dealing with it (reforming social habit) is to increase our detailed scientific knowledge. We need to know exactly the selective and directive force of each social situation; exactly how each tendency is promoted and retarded. Command of the physical environment on a large and deliberate scale did not begin until belief in gross forces and entities was abandoned.

Control of physical energies is due to inquiry which establishes specific correlations between minute elements. It will not be otherwise with social control and adjustment. Having the knowledge we may set hopefully at work upon a course of social invention and experimental engineering. A study of the educative effect, the influence upon habit, of each definite form of human intercourse, is prerequisite to effective reform" (p. 148).

Part three discusses the relation of intelligence to conduct. This section is difficult reading to those not recently come from the historical background of moral and economic theory. The theory of thought expressed is well known. The numerous influences that act upon the individual are continually upsetting the smooth action of habit or inadequately met by the original impulse. It is in this gap where action is uncertain that thought enters. It is here that opportunity for observation, memory and judgment arises. Habits and impulses are the tools of thinking. Objective results, practical outcomes of thoughts are not possible unless the data furnished by these are at hand. "Yet habit does not, of itself, know, for it does not of itself stop to think, observe or remember. Neither does impulse of itself engage in reflection or comtemplation. It just lets go. Habits by themselves are too organized, too insistent and determinate to need to indulge in inquiry or imagination. And impulses are too chaotic, tumultuous and confused to be able to know even if they wanted to. Habit as such is too definitely adapted to an environment to survey or analyze it, and impulse is too indeterminately related to the environment to be capable of reporting anything about it. Habit incorporates, enacts or overrides objects, but it does not know them. Impulse scatters and obliterates them with its restless stir. A certain delicate combination of habit and impulse is requisite for observation, memory and judgment. Knowledge which is not projected against the black unknown lives in the muscles, not in consciousness" (p. 177).

The effort to organize all of one's tendencies and to bring them into conformity with a few principles is too great for the majority of individuals. It is out of this difficulty or lack of effort that there arises the different one-sided theories of human conduct and behavior. Dr. Dewey discusses at length the various theories that have arisen to explain human action. Whether it be a moral theory, an expanation or justification of a single action, the thinking is too often done after the act. On page 276, Dr. Dewey calls attention to the effectualness of inquiry, of thinking, in technical affairs. Can intelligence be used before hand in social affairs. "The logical conclusion is that as yet we have no technique in important economic, political and international affairs. Complexity of conditions render the difficulties in the way of the development of a technique enormous. It is imaginable they will never be overcome. But our choice is between the development of a technique by which intelligence will become an intervening partner and a continuation of a regime of accident, waste and distress."

It has not been possible to bring into a short review the many pertinent illustrations the author has used. An extremely interesting chapter on 'What is freedom?'

discusses the relation between organization and lack of organization. The conclusion is that the relation between these for developing freedom is an experimental problem. Instead of appreciating the experimental nature of their problem writers on management either decry organization or make it a fetish, but nowhere is to be found this clear envisagement of the question as a laboratory problem to be solved by matching together the conditions of function of personality, of ability, and of objective. It is this continual testing of his statements by bringing them into close relation to practical problems that makes Dr. Dewey's book worth careful perusal. It presents no easy task. If one has but a half hour to spend on the book, it will not repay the time. If one has a series of half hours and a varied experience to check its conclusions with, it is worth all of the hours that can be spent on it.

THE GREAT GAME OF BUSINESS

By Frederick J. George. New York, G. Appleton and Company, 1920. ix + 175 pp.

REVIEWED BY H. G. KENAGY

Mr. Frederick's interesting little volume can be classed among the numerous writings during the past three years which have attempted to sell the business man and modern business methods to the common man—to those who in the past have often felt that business lived by exploiting the masses, through combines, trusts, monopolies and other equally feared practices. The author's theme is that business is a great game, played for the common benefit, and that its rules, when understood, make it possible for all to play and to win—if they have even fair skill.

All of us would like to see business conducted according to the rules which Mr. Frederick lays down, but most of us know that no such rules are now recognized by the majority of business men. "Playing the (business) game according to the rules" is not one of the deepest *instincts* of the male sex, though the author would have us think so. It is not an instinct at all. In fact few if any of the rules which he holds up as the ideals of modern business, can be traced to instinctive origins. A game of any sort comes to be played according to rules only after long and painful experience with the results of the unregulated expression of individual wishes and desires. As a game business is still largely in the class with sand lot baseball, where clashes occur, unfair advantages are taken, and the will of the strongest determines the ground rules. Even in big league business, individuals and companies are frequently guilty of "selling out" or of throwing a game for money.

The book will probably leave the reader a bit puzzled as to just what the business game is and who are the players. At one time competing business concerns are the players and the public is in the bleachers enjoying the game (p. 190, ch. XIV). In another chapter the seller and the buyer are the opponents of the game (ch. IX). It is in this latter kind of game only that the umpire is introduced. As for the rules of the game, at one point we are led to believe that the players, in a spirit of fair play, make their own (ch. III); in another place the umpire or "public opinion" seems to formulate them (p. 44). In fact the "game" analogy suffers at many points.

Mr. Frederick has attempted a highly popular, inspirational rule book for modern business, and few will object to his formulation if they think of business as it ought to be and, perhaps, is beginning to be. The style is bombastic, too much on the order of the 'pep' letters some sales managers write to their salesmen (ch. I, ch. III).

But, from the standpoint of the scientific student of business, the most serious defect of the volume is its broad and faulty generalizations about human nature (e.g.,

p. 138). The author seems to have read no psychology since the time of Professor James. His treatment of the psychological basis of business behavior cannot be compared, for example, to Professor Taussig's more accurate study in "Inventors and Money Makers." Such merit as the book has arises from the possible effect it will have in stimulating thought among business men about defining and abiding by some general rules or standards of business practice. Considered from this point of view "The Great Game of Business" may aspire to a place along with Babson's "Religion and Business Prosperity," Forbes "Men Who Are Making America," and "Keys to Success."

HUMAN ENGINEERING

By Eugene Wera. D. Appleton and Company, New York, 1921. xx + 378 pp.

REVIEWED BY ARTHUR W. KORNHAUSER

The aim of Mr. Wera's book is to present "a new principle—that of stimulating labor as a whole toward production at large for social purposes." His method is industrial coöperation secured through functional representation of employees in the management of industry. The book is devoted for the most part to questions of labor representation and shop committees. The author introduces enough psychology—most of it highly theoretical, much of it questionable, and part of it irrelevant—to support his views on workers' participation.

The book is divided into four parts. The first part deals with the evolution of modern industrial society, emphasizes the problems attending this development, and critically surveys a few of the attempted or proposed solutions—trade, unions, socialism, syndicalism, and coöperative organizations. The increasing complexity and interdependence of large scale industry and the need for far reaching coöperation, are well presented, as is also a picture of the transformation in the status of the worker from early craftsmanship to present day impersonal factory life. Capitalistic autocracy is roundly scored and a number of abuses in industry are pointed out, but the essential soundness of the wage system is nowhere seriously called into question.

Part II discusses the issues involved in employee representation and reviews the developments of the past few years in England and United States, ending with a few chapters that outline in some detail a suggested plan of committee organization for representation within an industrial plant. The only distinctive suggestion appears to be that the machinery for industrial coöperation should be more highly functional than in any current systems because at present "the uniform procedure in dealing with widely different questions . . . does not provide adequate treatment of the different matters brought before committees. . . . . The secret of success in coöperative management consists in drawing a multiple constitution with special provisions governing each interest and defining the powers and procedure proper to each interest." The author sees the necessity for coöperative dealing over wider areas than the individual plant but feels that "a national organization cannot be a starting step but is rather an ideal for progressive attainment."

Thus far there is little that most persons would think of as "human engineering." Part III is nearer expectations. This section of the book proposes to be "an application of collective psychology." It is based mainly upon the writings of Fouillée, Lebon, and Ross. Philosophy, ethics, and popular opinion are freely intermingled with psychology. We are told, for example, that "social morality is the collective categorical imperative dictated by the instinctive tendencies of mankind to

realize the larger life of society;" that "a sensation aroused by pain or prospective pleasure awakens emotion and the emotion, in turn, suggests a desire;" that "the subconscious self is not entirely inherited." A four fold classification of motives or desires is adapted from LeBon to which few competent psychologists would at present subscribe. These classes of desires are developed in a series of chapters which contain a unique admixture of scientific views with commonly accepted precepts, personal opinions, and more or less apt illustrations and applications.

The final division of the book deals with the practical applications of the principles of human engineering. The first chapter in this part is worthy of special mention. The problems of human engineering are figuratively represented by analogy with the mechanics of levers. The fulcrum is "loyalty;" the arms are respectively "ideals" and "traditions;" the force applied is "motives;" and the resistance overcome is a compound of "physical resistances" and "conflicting interests." "These five factors of life—loyalty, motives ideals, traditions, and interests—must be present and properly related in order that progressive activity obtains." The author's presentation of these points is novel—and, in the opinion of the reviewer, no less fantastic and artificial than novel. The conception of these five interacting factors is used throughout the remaining chapters of the book as a basis for discussing methods of promoting labor representation and motivating men in production, in industrial life generally, and in social life.

Mr. Wera has written a book that contains some sound council and a number of interesting points of view on the changing order in industry. In places he is dogmatic and in places moralistic where one might prefer scientific treatment. Opinions and facts are not always clearly distinguished from one another. A few of the discussions do not appear to fit in particularly with the general presentation, but this may be due rather to omission of guide posts than to real discontinuity of paths. The book is neither radical nor ultra-conservative in attitude, though bias does not seem to be entirely absent in such statements as: "All radical movements are based on naive conceptions of human nature." or "In the United States, from its earliest beginnings, the shop-committee movement has been neutral toward unions."

"Human Engineering" was written by an industrial engineer; not by a psychologist, not by an economist, not by a student of labor, not by a business man. Yet it draws heavily upon material in each of these fields and quote freely. But it does not quote sources that the scientific reader would expect. In the study of the psychology of motives, we find no mention of such writers as McDougall, Shand, Thorndike, Watson, Woodworth; in the study of trade unionism, industrial democracy, and "ways out" of our industrial problems, there is nothing from the Webb's nothing from Hoxie, nothing from Commons' History of Labor in the United States, no mention of guild socialism (And this, though Mr. Wera is dealing with precisely those matters most discussed by the guildsmen). Perhaps these points do not much matter to the ordinary reader or business manager who takes up "Human Engineering." In that case, there remains in the book a great deal that is decidedly worth reading.

THE FOUR HOUR DAY IN COAL

By Hugh Archbald, Mining Engineer. The H. W. Wilson Company, New York, 1922. xv + 145 pp.

REVIEWED BY LLOYD M. CROSGRAVE

In this little book the author endeavors to show that the bituminous coal mining industry in the United States needs to be re-organized in the interest of all concerned with it—the workers, the operators and the consuming public. This is because it is very greatly over-developed so that under the best of conditions it can be operated only a part of the year and because, when it is being carried on, the work is being done much less efficiently than it might be.

The author does not advocate particular reforms, but urges that the industry as a whole be studied, with a view of eliminating the surplus mines, and that those mines that remain in operation keep adequate records and carry on experiments in efficiency that will enable them to be more productive in proportion to the labor expended. Only by these methods can the comparatively low incomes of miners and operators and the high price of coal to the consumers be remedied.

The cost of over-development is placed at from $200,000,000 to $300,000,000 a year. Mr. Archibald estimates that for a boom year the over-development amounts to 60 per cent; for normal years to 80 per cent, and for years of depression to 125 per cent, and that it tends to increase.

The cost of inefficient management of the mines is not easy to estimate, but is probably as much or more than is the cost of over-development. This poor management results in the workers being forced to be idle during a very considerable portion of the time when they are in the mine and it causes the work when actually carried on to be much less productive than it might be.

"If they average four hours actually working while they are in the mine they are doing well. The arrangement—the organization—of the work of a mine does not give the miner the opportunity to do more. The days of work are not only intermittent during the year, but the hours of work are also intermittent during the day. It is this intermittency underground which needs emphasis."

Many anecdotes and illustrations are given to make clearer the lack of efficiency that is to be found in the average soft coal mine. A necessary corollary to the other conclusions of the book, and one that the author evidently wishes to make, is that the workers have very strong reasons for being dissatisfied with present conditions in the industry.

HOW TO MANAGE MEN

By E. H. Fish, The Engineering Magazine Company, New York, 1920. xii + 337 pp.

REVIEWED BY L. D. ANDERSON

The book is a good summary of the literature on personnel management but suffers, as do all books in this field, from a too great use of generalities. Statements such as these, "The interviewer should be a man old enough to command the respect of every applicant but he should not be so old that he is unappreciative of new ideas," leave me with the impression that employment management will never become a science until we throw out such statements as these and deal only with specific facts that give definite clues to the proper functioning of employment managers.

This book is divided into four parts; "Establishing the Employment Department," "Problems of the Employment Manager," "Promoting Industrial Relations," and "Industrial Education." The first part takes up the general policy that the management should adopt in its labor relations, standards for selection and training of employment managers, the machinery of employment, and the basic factors whereby the work of the employment department can be evaluated. Mr. Fish emphasizes the fact that at present there is no way of measuring the worth of the department. The work of the sales manager or the production manager can be measured in dollars and cents, but this cannot be said of the employment manager. Therefore, for success, the employment manager must have the firm backing of his company in every matter that he attempts to solve, and he should rank with the sales and production manager. His job should be considered as a major operation and not the minor one that it is in so many plants.

The second part of the book is mainly devoted to the problems that all employment managers have to face. Such problems as selection, training, administration, association with other departments, and measurement of turnover are discussed. The chapter on the "Selecting and Placing of Workers," is a very good treatment of the subject. Mr. Fish brings out the point that selection can only be done along broad lines. He says, "Any one who claims to be able to distinguish between men fitted by nature to be plumbers and those fitted for steam fitting, or between carpenters and cabinet makers, is probably mistaken." If the author means by this that selection of the men best fitted for a trade is not possible, only a long board lines, he is undoubtedly right, but if he intends to include the selection of workmen, already in the trade, he is probably wrong. The work of testing in the army accomplished the very things that he states are improbable. The chapters on "Women in the shops," "Employment of minors," "Employment of Cripples," and "Social Misfits" are the most glaring examples of the use of generalities.

The title of the third section, "Promoting Industrial Relations," gives a clue to the things discussed. The strongest discussions are in the last two chapters on labor turnover. The author emphasizes the fact that individual strikes, i.e., men quitting, are often as fatal in their consequences as concerted action by all the workmen. Mr. Fish gives some of the common reasons for men leaving a company's employ. Among them, and one that is not often spoken of, is the need by the workman of ready cash to tide him over a crisis. He states that an employee rarely wants a big loan more than once in his life, and that the company should make every effort to help the workman in negotiating such a loan. Much of the labor turnover today is caused by the employers themselves. They set forth in glowing terms the advantages of work in their plant, they emphasize the schools, the town or what not, in order to get the workmen to leave other plants and go to their own. In this way they are making the employees of other plants discontented and desirous of change. If this practice were stopped labor turnover would not assume the immense proportions that it does in some plants.

The fourth section on industrial education is a very good discussion of the problems that face the modern plant in the education of its workmen. Training of the workman is considered at some length. This emphasis is based on the fact that the effectiveness of the individual workman and his worth to the company is increased considerably by education. The training of foremen, a subject that is being discussed more and more is taken up along the following lines, the status of the foreman, his opportunity, his first job, the characteristics of an ideal foreman, how a foreman should handle men, holding men on the job, and the proper ways to give instruction.

In conclusion, Mr. Fish has handled his subject and has organized his book very well. Any criticisms that could be leveled against the book can be leveled against employment management books in general. Until an exact body of laws are formulated, writers on employment management will

be forced to qualify their statements and to write in generalities. In regard to specifying what qualities are necessary for a workman in a given job nothing satisfactory as to these qualities can be done until studies are made, either by psychological tests or by observation of a great number of men in a particular job.

THE ROMANCE OF A GREAT STORE

By Edward Hungerford. Robert McBride and Company, New York, New York, 1922. xii + 281 pp.

Reviewed by Natalie Kneeland

A history of the development of a department store might seem to the uniniated a most prosaic subject, but Mr. Edward Hungerford in his book "The Romance of a Great Store" has shown that it can be fascinating as well as instructive.

Perhaps the book's greatest merit lies in its clear protrayal of the definite steps in the development of the ideals which the founders had in mind and in the methods for carrying them out. Furthermore, not only has the author shown the development of one particular store, namely R. H. Macy's but also, at the same time, he has been signally successful in portraying the progress of the whole mercantile movement.

This progress is given to us through a series of pictures, beginning with the very earliest days, when Macy's as a store, existed only in the mind of the sailor founder; through the first days at 6th Avenue and 14th Street, and moving on up to its present location in Herald Square. Not only does the modest shop of the early nineties change before our eyes into the institution now known as one of the most successful mercantile establishments in the world, but New York itself grows along with it. We see the changes in the different parts of the city, largely brought about by the development in transportation facilities, gradually forcing the retail business farther and farther up-town, which, in turn, drives the residental districts before it.

No less distinct are the figures of those who planned and carried on the work. The most vivid of these, is that of the founder himself, who gave to the store not only his name but the symbol of the red star, so indelibly connected with it. The story of the star is but one of the many incidents given which make this part of the book such delightful reading. So much for the "yesterday" of the store.

This account of the historical development of the store is followed by a description of the store as it is today. The treatment of this part of the book is less satisfactory than the first. The facts about the organization and activities of the store, given in such detail, do not remain with one after the book is closed. Furthermore, for those familiar with store organizations it does not offer anything of great interest, while for the uninitiated a more concise form would undoubtedly leave a clearer impression. Its greatest value is probably to the store itself, standing as a statement of the present organization, which may prove invaluable in planning for the future.

For the outsider, the historical account given in the beginning of the book, if separately bound, might well be a book worth keeping and re-reading, especially if it contained the same illustrations by Vernon Howe Bailey, which add so much to the present volume.

Abstracts

The Nature and Status of Business Research. LEONARD P. AYERS. Journal of the American Statistical Association, March, 1922, Vol. 18, pp. 33–41.

The business statistician must look into the future. The University economist and the government statistician seldom are called upon to submit their conclusions to the immediate and drastic test of application. The business man is usually innocent of a thorough understanding of economic laws. The business statistician has usually failed to measure up to these high requirements. He has not bridged the gap between knowing and doing. His work has seldom influenced conditions even within his own organization. His work relates to purchase of raw materials, to production, and to sale of output. The task is to study the figures of the past and the present, and from them draw just inferences as to the probable future. The importance of his results depends on the increase in money returns traceable to his work. The business statistician should be thoroughly familiar with the significance of the general business cycle, of the cycle of his own industry of the money market, of wages and the cost of living, of methods of estimating future demands, and of the methods of measuring long time trends. These problems necessitate a new profession. It calls for thorough training, wide range of knowledge, resourceful ingenuity combined with an unfailing ability to turn out results of practical usefulness. It involves knowledge of economics, statistics, and research ability. Business statistics is traditionally clerical; compiling figures needed immediately. Real research involves the use of scientific methods; these demand four processes, analytic scrutiny, exact measuring, careful recording, and judgment on the basis of observed fact. To be other than a clerical worker, two conditions must be observed. His office must sort out essential facts and interpret their significance. He must present them personally and enter into the discussion regarding their usefulness. To meet the latter requirement, he must be able to write simply, to speak with lucid brevity, and to use graphic methods skillfully. Business needs such men, and can afford to pay them well. Its disregard of elementary principles has produced many of the financial difficulties of the past few years. For his part, the business statistician must prove his worth through publication and breadth of training and business insight.

A Contribution to the Mental Pathology of Races in the United States. PEARCE BAILEY. Mental Hygiene, April, 1922, Vol. 6, No. 2, pp. 370–395.

Doctor Bailey uses United States Army data in making his race comparisons. He analyzes about 20,000 fully classified cases of mental pathology found among volunteers and draftees in the United States Army. These cases are divided into nine clinical groups, as follows: mental deficiency, psychoneuroses, psychoses, nervous diseases and injuries, epilepsy, constitutional psychopathic states, endocrinopathies, and alcoholism and drug addiction. The prevalence of each of these divisions among the patients of a certain race was determined in terms of per cent. These per cents for each of the races were compared with the percentages distribution of each of the clinical divisions among the psychopathological cases in the United States. Thus, 29.2 per cent of white cases were classified as mentally deficient, whereas among colored cases the per cent is 48.3. Among Southern whites the percentage of mental deficiency is as high as

among negroes. There is a low distribution of alcoholism among negroes. The proportion of mental deficiency among the American Indian cases is 62.9, among Mexicans it is 66.9. The latter seem to be swamped in their own dullness, and they cannot develop, to any extent, any of the disorders that indicate an active or emotional intelligence. The percentage distributions of the various disorders for the Dutch and English are practically the same as for the United States. The foreign born Germans show a higher proportion of insanity than the native born. The percentage of mental deficiency is lowest among the Scotch and the Jews. The latter exceed in conditions characterized by emotional instability. Inebriety is highest among the Irish and Scotch. The native-born Italians present a distribution of neuropsychiatric disorders which indicate a sluggish, backward mentality. Some points which the author brings out as suggestive are the following: There is an antagonism between mental deficiency and alcoholism in that the two conditions do not exist in greatest abundance among the same groups of people. Mental disease implies a developed intelligence and is therefore less frequent in communities of low average intelligence. Alcoholism is indicative of more active mentality than the solitary use of drugs. There is a sort of compensation in the mental disorders of a race, in that a weakness in one respect is overcome by strength in another mental respect.

The Coal Miners' Insecurity: Facts about Irregularity of Employment in the Bituminous Coal Industry in the United States. Louis Bloch. (With additions by other members of the staff. Russell Sage Foundation, New York,) April, 1922, 1–50, Tables 14, Diag. 8.

This pamphlet brings together "dependable data drawn mainly from publications issued by state and federal bureaus, which show some of the economic facts behind the unrest of the miners in the bituminous or soft coal industry" (p. 3). It does not suggest corrective measures. It gives figures on production and use of soft coal capacity of existing mines, average days of mine operation, increase in number of mines and in number of miners. "From an average of 186 days of operation of the mines in the five years from 1890 through 1894, the opportunity to work and to earn fell in these mines (in Illinois) to 169 in the five years from 1915 to 1919 while in that period the number of miners increased from 33,610 to 82,937." For the United States as a whole for the same periods, days of operation per year increased 6 per cent and the number of miners increased 173 per cent. Causes of intermittent employment discussed in the pamphlets are, seasonal demand, over-development, business depression. Days lost traced to these factors by statisticians of the Geological Survey are in order 47, 37 and 16 per cent. Strikes and car shortages are considered secondary. The year 1910 set the record in man-days lost because of strikes and also set a new record of production (pp. 24–25). The Bureau of Labor Statistics defined full time as the number of hours regarded by employer and employee as constituting a day's work. In a special investigation where careful records were kept, 102.5 full-time hours or a half month was used as the base. Hand miners worked during this period 60 hours, the mines were not in operation 31.4 hours and 11.1 hours of opportunity for work were not used by the miners. This "absenteeism" is traceable presumably in part to irregular habits of work produced by irregular opportunity for work. Various estimates of total yearly earnings and cost of living figures are given. The excess of capacity to produce coal over actual requirements is estimated at 200,000,000 to 300,000,000 tons a year or 40 to 60 per cent above requirements. Increased demand resulted in opening new mines and employing more miners rather than in giving more regular employment in mines already operating. Seasonal variations result in an excess in numbers of men employed in the industry and this tends in turn to make employment more irregular and uncertain.

The Thorndike College Entrance Tests in the University of California. J. V. BREITWEISER. University of California Press, Berkeley, California, January, 1922, pp. 17.

In January, 1921, 1182 students at the University of California took the Thorndike college entrance examinations. The great majority of this number were entering freshmen. The purpose in using this type of examination was to see if such a test would give a reliable prediction of success in college. Semester grades, as reported in the Recorder's office in June, were reckoned as the measure of success at the University. These grades were weighted in the following manner:

Multiply the number of units or hours of grade 1 by 9, of grade 2 by 8, grade 3 by 7, grade 4 by 6, grade 5 by 0. The scholarship total used as the criterion was the sum of the points obtained from the above products.

Results

1. The entire examination and average scholarship correlated Pearson + 0.468, Spearman, +0.403.

2. According to their tests scores when plotted, the failed and withdrawn students arranged themselves in a group toward the lower end of the total distribution curve.

3. The lowest quartile, according to scholarship grades, arranged themselves toward the lower end of the total test distribution curve.

4. The highest quartile according to scholarship were found towards the upper end of the test curve.

5. The scholarship record of the men is more irregular than that of the women.

6. Median scholarship grades and test scores were found for the various colleges within the University. The test scores agreed well with the scholarship records.

7. Age of students correlated negatively with test scores. Younger students made better scores. Semester grades bore this out.

8. A classification was made according to High School from which the student came. Spearman correlation coefficient between median score and median grade for the 14 schools sending enough students to warrant a place in the study was r = ±25.

Conclusions

The results of the investigation were very satisfactory. The committee recommended that:

1. An officer be appointed to take charge of a bureau or committee on tests and student welfare.

2. The test and welfare committee should give tests to every entering freshman and special personal attention to all students whose scores fell in the upper and lower quartiles of the distribution.

3. Advice could be given to High Schools on the basis of tests.

Keeping the Human Machinery off Scrap Pile. EDWARD S. COWDRICK. Industrial Management, June, 1922, Vol. 63, No. 6, pp. 324-325.

Sketches briefly the need for and chief items included in a health research agency in industrial concerns and businesses. The conservation of health, having a direct relation to the value and duration of the service rendered, is the concern not only of the man himself but of his associates and superiors. A thorough physical examination, accurate records and the solid backing of the management are prerequisite to a successful system of health research, but once these are guaranteed there is little doubt as to its benefit. A few examples of beneficial results are listed.

Mental Health and The Newspaper. N. A. CRAWFORD. Mental Hygiene, April, 1922, Vol. 6, No. 2, pp. 300-305.

Pleads for the use of newspapers in making the public acquainted with the psychopathology of everyday events. The public, believes, for instance that too many murders are acquitted on the grounds of insanity, whereas the opposite approaches nearer to the truth. Many sex delinquencies are played up in the newspapers as due to wilful moral turpitude, and the offender is classed as a degenerate or fiend. That the offender is suffering from a disease, is not made clear by newspapers. The newspaper can aid in the establishment of higher standards of mental health in the nation, first, by interpreting to the people the men-

tal diseases that predispose to crime or other antisocial activity; secondly, by aiding, both through precept and example, in the elimination of those pathological fears that are so marked and sinister a characteristic of American life.

The Minimum Wage in Canada. KATHLEEN DERRY AND PAUL H. DOUGLAS. Journal of Political Economy, April, 1922, Vol. xxx, No. 2, 155–188.

An analysis of the nature of the minimum wage laws in effect in Canada. The analysis shows that in all but one case the wages are fixed on the basis of the "necessary cost of living." The one exception, the 1921 amendment to the Ontario act, bases the wage on the finanicial condition of the industry. Canada is reluctant in extending the minimum wage to men. The powers of the different provincial boards vary from jurisdiction over wages alone, to power over hours and conditions of labor as well as wages. There is a tendency to establish varying wage limits and working standards within a province, not only for different industries but also for different localities as well. The dominant political parties have too much power in delaying or actually preventing minimum wage legislation, in Canada.

The article includes an analysis of awards issued under Canadian Minimum wage laws.

Welfare Work in a Shipyard. By "DOCKER." Welfare Work, 3: 83, May, 1922.

Outlines the aims and achievements of welfare work in the shipyards of England. The disparity between these two phases is explained by the prevalence of casual labor in this industry, that is, workers drift from one yard to another and are therefore more employees of the industry than of any particular firm. A joint welfare scheme and a joint employment office are proposed. The former has been provisionally approved by shipyards directors, the latter has not yet been considered by either employers or the unions. Some actual advances have been made in the improvement of the apprenticeship system—a keener interest has been aroused in foremen, better evening school attendance and progress, are reported, all boys are properly indentured. Improvements have also been effected in canteens, sanitation and first-aid service.

Measuring Executive Ability. W. E. DUNN. Industrial Management, May, 1922, Vol. 63: 292–295.

It is now accepted business practice for concerns using electrical power to pay for it by measure. It is just as good business practice to pay for executive ability by measure. The basic principles of physics that *action may be measured in terms of its effects or results,* can be applied to the work of men despite the complexities of human action. Several formulae, in terms of ratios, are suggested, as steps in the process of measurement:

First Factor—Rate of Production.

Formula: $\frac{\text{Amount of Results Accomplished}}{\text{Time Required in Performance}}$ = Rate of Production.

Second Factor—Rate of Increase in Value.

Formula: $\frac{\text{Value of Results}}{\text{Costs of Production}}$ = Rate of Increase in Value.

A combination of these factors gives a measure of executive ability, according to the following equation:

$$\frac{\text{Amount of Results}}{\text{Time}} \times \frac{\text{Value of Results}}{\text{Cost}} =$$

Measure of Executive Ability.

But this measure does not take into account the difficulty or ease of the work done, so does not make possible accurate comparison of the ability of men performing different kinds of tasks. Therefore a third factor must be introduced:

Third Factor—Measure of the Situation.

Formula:

$$\frac{\text{Product of the Difficulties Encountered}}{\text{Sum of the Means Available for Use}} =$$

Measure of Situation.

Combining the three factors we have the general formula for measuring executive ability:

$$\frac{\text{Amounts of Results}}{\text{Time}} \times \frac{\text{Value of Results}}{\text{Costs}} \times \frac{\text{Product of Difficulties}}{\text{Sum of the Means}} = \text{Index of Executive Ability.}$$

In using this formula, practical standards of measure and means of measurement and also some considerable training in their use are needed. For "time" there is a scientific standard of measure. Value of results, costs, means, (that is, resources, assets and capital), are measured in terms of money. A scale for measuring the difficulty of jobs can be developed *by using the quantitative features of job analysis*—to make use of the records from standardized duties and tests, so as to measure with scientific accuracy the relative degree of difficulty these various duties and standard tests. The principle of the scale is as follows: *The difficulty of the job varies inversely as the percentage of those candidates who are able to attain the required standard of performance. Raising this standard increases the difficulty of the job.* With the data of such performance at hand, compute the percentage of men who attain the required standard. Divide unity by this percentage. The quotient is the measure of the difficulty of that particular duty under the given conditions. If fifty per cent of the candidates are able to attain the required standard in any test, the difficulty of the test is two, while if but one man in a thousand is able to pass the test, its difficulty is one thousand on this scale.

Research Versus Propaganda in Visual Education. FRANK N. FREEMAN. Journal of Educational Psychology, May, 1922, Vol. 13, No. 5.

Presents arguments to prove that there has been too much propaganda and not enough research in the cause for visual education. States that the most common statement made by advocates of visual education is "It is estimated by psychologists that 90 per cent of our sensory experience comes through the eye. It is also commonly accepted that the higher mental processes, such as memory, imagination and reasoning, are founded upon sensation. It follows, therefore that education should appeal to the sense of sight." This argument is refuted by the following steps. There is not, so far as the writer has knowledge, any statement such as the above made by any psychologist. Although an experience may be initiated, by vision it may largely be non-visual. Sensations of the moment are supplemented by other sensations from other sense organs. It can never be determined just how people think; in what sense field they do their best work.

From a study made by F. D. McClusky on 700 children it is concluded that there is no justification for the adoption of the visual methods in exchange for those already in use, even if those methods are of the newer motion picture variety.

The limitations of the visual method are two in number. In the first place we have not grown away from language, and only crude situations can be put across without it. In the second place, by the use of visual presentation the personal influence of the teacher is non-operative. There is no social interaction of members of the groups.

The advantages of the visual method are: visual stimuli possess an immediate appeal and certain types of relationships may be most clearly apprehended when they are represented visually.

Conclusion is that experimental investigation is needed to determine what type of educational matter visual presentation is most adapted to and the manner in which it may be best organized.

Some Considerations for the Physician in Industry. C. E. FORD, M.D. The Journal of Industrial Hygiene, May, 1922, 4: 1–8.

Purposes to crystallize the somewhat nebulous views as to what industrial medicine is; and to show that the industrial physician will render the greatest service when he has come to realize that industrial medicine is no longer a matter of medicine and surgery or hygiene and sanitation alone, but that it must be widened to include fundamental factors associated with plant processes and the materials used therein, as well as the more personal problems arising out of industrial life. The following are a few general problems confronting industrial physicians as a group:

1. Definition of the proper limitations of the industrial physician in relation to general community health activities.

2. Formulation of a practical scheme for supplying health service in small plants.

3. Creation of departments of industrial hygiene in federal, state and local health departments. The individual industrial physician will come in contact with the following problems among others:

1. Plant organization.

2. The fundamentals of industrial relations.

3. Employment methods, special problems relating to the employment of women and children, etc.

4. Absenteeism and security and continuity of employment during convalescence from accident or disease and during slack seasons.

5. Physical working conditions.

6. Pensions and insurance.

Russian Wage Systems under Communism. AMY HEWES. Jour. of Pol. Econ., April, 1922, Vol. xxx, No. 2, 274–278.

A discussion of the various systems of payment that have been tried by the Bolshevik government from the time it came into power down to the present. The present new economic policy dates from the spring of 1921. According to this policy large-scale industry is retained by the state, secondary enterprises are given over to the initiative of private individuals and groups, and undeveloped resources are thrown open to foreign capital. The article presents the wage system applying to the factories and other enterprises which are operated by the state. The system embodies some of the features most disliked by organized labor in capitalistic countries. It is still too early to measure results on a significant scale.

Salary Standardization as an Aid to Industrial Stability. HARRY ARTHUR HOPF. Reprint, H. A. Hopf and Company, 1922.

Discusses the importance of the wage problem in industry, and principles and responsibilities involved in wage determination for administrative workers. The preliminary problems of job analysis and job classification are discussed in some detail. The method of determining salary rates and of establishing a schedule of salary rates and intermediate step rates is illustrated by a hypothetical case of a company employing one thousand administrative workers. The following specific conditions existing with respect to salary standardization are discussed:

1. The practice of advancing employees on the ground of length of service without regard to the valuation of the work involved.

2. The entrance of employees at rates in some cases below the proper minimum, in others (especially during the War) at abnormally high salaries.

3. The practice of making general annual salary adjustments instead of following a plan of review on service anniversaries.

When a salary standardization has been achieved in an entirely objective manner, individual variations above or below the maximum should then be adjusted according to a definite plan.

Several administrative principles are formulated and a detailed solution of each of the following problems is presented:

1. Payroll trends.

2. Ascertainment of payroll costs.

3. Calculation of rates of exit.

4. Calculation of future payroll.

In summary, the scope of salary standardization is defined by the provision of a scientifically determined wage, the proper pricing of jobs, the charting of lines of promotion, and the individual consideration of employees for advancement at stated periods on the basis of demonstrated merit. It does not preclude any other form of financial incentive such as prizes, bonuses or profit sharing. It may be assumed that administrative employees want a fair wage, good working conditions, security and an opportunity for advancement. Assuming that salary standardization could not exist independently of the first two factors, it may be asserted with confidence that, security and opportunity for advancement can be provided in no more effective manner than by the establishment and maintenance of a plan of salary standardization embodying the principles and practices which have been outlined in this paper.

First Aid. Medical Emergent Aid Practically Applied in Industry. S. DANA HUBBARD. N. Y. Medical Journal, January 4, 1922. Reprinted by the Department of Health of the City of New York, pp. 12.

Develops the educative features of the medical staff in an industrial organization. Preventive medicine has it place in industry as well as curative medicine, and education as well as first aid is a function of the medical staff. The author assumes the educative and preventive functions to be phases of first aid. Some of the functions of industrial hygiene and the medical staff are the prevention of accidents and disease; the elimination of nuisances, such as smoke and garbage; maintaining proper heating, lighting and ventilation; providing suitable food; installing and managing dispensary and hospital service; keeping statistics regarding accidents, disease, etc.; supervision of fire prevention, educating workers in personal hygiene; research of any special nature to preserve health, prevent accidents, increase efficiency, and improve safety; supervision of clothing; and elimination of fatigue and making provision for recreation. The most important functions are education and first aid in the narrower sense. The author elaborates these, demonstrating how education and first aid must be established and what are the conditions of their most efficient application.

Fatigue Effects as Measured by Sugar Content of Blood. BUFORD J. JOHNSON. Comparative Psychology, April, 1922, Vol. 2, No. 2, pp. 155–171.

This experiment was performed for the purpose of studying changes in the sugar content of the blood of children as related to different kinds and amounts of activity. Eight subjects, four boys and four girls (selected because of a relatively low resistance to physical fatigue and the fact that they expended a high degree of effort for such scores as they obtained in their psychophysical examination) were used throughout the experiment. After some preliminary practice for the purpose of familiarizing the children with the test, the procedure was as follows: A specimen of blood was obtained immediately when the child came for the test. It was then given, in Series I the target test, 100 throws with the right hand; dynamometer 10 trials, left hand; tapping, alternate plate, for two minutes with right hand; tapping, single plate for two minutes with the left hand. After the testing another specimen of blood was obtained. Series II differed only in the type of test used. In this set tests for coördination, discrimination, memory for digits and substitution were made. It was impossible to get definite standards as to the normal sugar content of blood for the ages considered because of the variability found in the same individuals in the preliminary examinations. The results obtained after the test series also show a high degree of variability. A child might show a relatively high sugar content before exercise and then either a slight or marked increase or even a slight decrease after the exercise. The author believes, therefore, that conclusions as to the influence of the kinds and amounts of activities upon the sugar content of the blood would be unwarranted by her data. However, the experiment indicates a method of investigation that may clarify the concepts of fatigue and lead to a reformulation of the factors involved in fatigue effects.

Empty Heads Make Poor Clerks. H. G. KENAGY. Forbes, May 27, 1922, Vol. 10, p. 180.

Discusses the use of an intelligence test in the selection of clerical workers. Such a test was given a group studying stenography in a technical night school, and scores checked against subsequent success or failure in the course. There was apparently a critical score of 60 below which about 70 per cent of the failures fell and above which were 95 per cent of the successes. This is shown graphically and arranged in conjunction with three other charts to facilitate comparisons. The three other charts indicate scores made by twenty stenographers in one business firm, comparative scores of a group of stenographers and private secretaries in another firm, and scores made by fourteen stenographers picked from five business concerns as their

very best. The data presented prove that a certain level of general intelligence is essential to satisfactory work as a stenographer. While it is not the only factor to be considered in selecting office workers, it is an important one which has not been given the consideration it deserves. The efficiency of any office group can be improved by establishing an intelligence standard for applicants seeking positions in the company and, further, the use of intelligence tests will reduce turnover and thus reduce the general overhead.

Pitfalls in Rating Schemes. FREDERICK B. KNIGHT AND RAYMOND H. FRANZEN. Journal of Educational Psychology, April, 1922, Vol. 13, No. 4, pp. 204–213.

When subjects rate themselves or others for several qualities certain tendencies (probably unconscious) are present that make it necessary to be on one's guard in the interpretation of ratings. The first of these pitfalls is the tendency for a person to overrate himself when he compares himself with a group; his own rating comparing very favorably with that of his ideal for the group, the group being on the other hand rarely what he believes it should be. The second pitfall occurs when analyzed rating scales are used. The inter-correlations of ratings for specific traits are so high that general opinion must be present in ratings given to discrete traits. Also the inter-correlations are so varied that it is impossible to diagnose the general factor and describe it. The conclusion then is that in analyzed ratings there is a spread of aura present, but in no certain amount.

A Social Relations Test. M. J. REAM. Journal of Applied Psychology, March, 1922, Vol. 6, No. 1. pp. 69–73.

The test is designed to measure the social type of intelligence. It is composed of fifty items taken from twenty lines of social diversion and contains three general classes of items, the socially acceptable, the sport, and the questionable items. Correlations of scores made by life insurance salesmen with an omnibus test adapted from the army alpha averaged 0.60 and with other tests only 0.07, 0.09 and 0.20. Older men scored higher than younger men. The test seems to have more negative than positive value in selecting life insurance salesmen. It is of further value in throwing light on an applicant's interests and activities outside of working hours.

Iodin as a Wound Disinfectant—Recent Research. FRANK L. RECTOR, M.D. The Nation's Health, January, 1922, Vol. IV, No. 1.

The conclusions reached in this study are quoted entire: From the information summarized herein it would seem that the use of iodin as a skin and wound disinfectant still holds first place in surgical technic, particularly in the industrial medical field.

Such objections as were raised were against the danger of burns and the discomfort iodin caused rather than against its efficiency as a sterilizing agent.

As far as could be determined, for the past ten years little if any research work has been done on the use of iodin as a sterilizing agent in surgical work.

In spite of the great popularity attained by chlorin compounds in the treatment of war wounds, iodin still holds first place in the treatment of injuries in civil life.

The results of this survey indicate that the majority of physicians engaged in industrial medical work prefer the use of a solution of 5 per cent strength, or less. The Conference Board of Physicians in Industry has since its organization recommended the use of a 3–3½ per cent solution (or 50 per cent U. S. P. tincture), and in the light of present experience feels that this continued recomendation is justified.

Job Analysis as an Aid to Cost Reduction. DONALD E. ROWE. Industrial Management, June, 1922, Vol. 63, No. 6, pp. 341–346.

The greatest portion of the production costs of everything bought and sold is the cost of labor. It is therefore extremely important to know what each job is worth and what type or grade of worker it requires. The problem is to secure information which will make it possible eventually to set up in terms of dollars and cents a "Value" for each job—such values to be

commensurate with each other. Job analysis is the method which must be used.

The work of fitting employees into the jobs for which they are best suited, the intelligent transfer of workers, promotion from job to job—these things all require definite knowledge of jobs and of workers. The ratio of pay in one group or in one type of work is often far out of line with the rate for similar work in other departments, because there is no way of checking or comparing the actual worth of different jobs. Especially valuable to the plant engaged in operating a training school is the knowldege of just what jobs to institute a training school for.

In carrying through the job analysis, several things must be kept in mind. First, it is possible to go into too much detail. Labor is too intangible to be measured like raw materials. Second. take the foremen fully into confidence and use them as much as possible. Their assistance is invaluable and an authoritative analysis of all jobs gives each foreman invaluable data in handling requests for wage increases, etc.

The four major steps in making an analysis of jobs are:

1. Determination of the element to be gone into for each job.

2. Determination of just what constitutes the vital elements of each job and the important points to be observed in the type of worker required.

3. Grouping of all jobs into classes of a similar worth to the company and the establishment of rates of pay for these different classes.

4. Assignment of the worker to the proper job and job class. Also the readjustment, where necessary and practical, of the worker's rate of pay.

In studying the jobs, both the work itself and the type of worker required must be kept in mind As to the job itself, the following points must be observed.

1. A full description of just what the job is. Sometimes job names are very misleading.

2. Number of people on each job at present, segregated as to sex, age groups, etc.

3. Previous experience required on each job.

4. Age at which worker can best start at each job.

5. Length of time required to learn each job.

6. Physical factors of each job, such as heat, light, air, occupational diseases, etc.

7. Type of work, whether routine or non-routine.

8. Present rates for job.

9. Special conditions which put job in a class by itself, if there are such.

From such a careful but not too detailed analysis of jobs and qualifications of workers, all needed data for subsequent developments can be put into the hands of a shop committee charged with the classification of jobs and the establishment of rates of pay, which is the vital part of the whole plan. In making its decisions the committee must be guided at all times by the actual data as to how much each job is worth to the company. Care must be taken that the job is not overrated as to the type of worker required. Length of time required to learn a job, the special skill or dexterity which must be developed, rate of turnover on the job, etc.—are facts which must be considered.

In establishing rates of pay for classes, care must be taken not to create too many classes of almost identical worth. There should be as uniform a separation between classes as possible. Minimum and maximum rates for each class should be established, except in cases where piece rates are used. In such cases, only a base rate can be set.

The allocation of each worker to the proper job within the proper class is the last stage of the work. This involves the determination of the highest type of work each person can do. It also involves wage adjustment in cases where the wage received is higher or lower than the new rates assigned to the job. The rule of expediency governs in adjusting salaries of old employees, but new workers should be taken on strictly in accordance with the new rates.

Creative Imagination. RAY M. SIMPSON. The American Journal of Psychology, April, 1922, Vol. 33, No. 2.

Reports a test designed to measure creative imagination and its use with a

group of school chidren. The test serves to indicate in a concrete way the latent "creative" capacities of individuals. The teacher's possession of such a knowledge of her pupils enables her to give them the greatest opportunity possible to develop their talents. The test consists of five sets of four dots arranged in a square formation. The instructions are to place two additional dots anywhere and connect the dots. The subject is to place the dots in different positions and endeavor to get original designs. One point credit is given for a change in decorative drawings and one point credit for a change of object in representative drawings. The principal conclusion is that the test gives equal chance of expression to the "dreamer of dreams" and the planner, the moulder, and the constructor.

Analysis of Accident Causes. Safety Bulletin, January, 1922, Vol. III, No. I, Published by Bureau of Safety, Chicago, Ill.

Attempts a scientific method of classification based on the actual causes of accidents regardless of the medium through which they occur. A typical analysis shows 16 primary causes of accidents. In many instances the character of the accident itself suggests the remedy.

1. Class of work beyond physical or mental ability of the injured.
2. Improper tools or devices.
3. Lack of proper instruction.
4. Method pursued not suitable for work.
5. Protective devices not used.
6. Rules or instructions not observed.
7. Protective devices not provided.
8. Lack of proper inspection and maintenance (defective tools, materials, and devices).
9. Contributory negligence of others.
10. Intemperance.
11. Mechanical manner of doing work (lack of concentration).
12. Haste.
13. Physical condition of injured.
14. Poor judgment.
15. Wilfulness.
16. Conditions beyond control (*a*, elements; *b*, non-industrial).

How Correct Seating Affects Manufacturing Profits—The Importance of Seating and Its Relation to Fatigue and Production. Irving Salmon. Industrial Management, June, 1922, Vol. 63, No. 6, pp. 326–336.

Emphasizes fatigue's part in production, and seating's part in the production of fatigue. Specifies conditions which should be fulfilled by good seating and describes in detail different types of seating arrangements. Seating should be designed in accordance with the anatomical requirements of the individual worker. Height, seat, back rest and foot rest are the four elements to be considered, the general specifications of which are dependent upon the factors that accompany the operation. Fourteen plates and illustrations together with recommendations regarding them and discussion of the factors entailed indicate the best forms for adoption. Employers should make a study of their seating problem by

1. Analysing the operation involved.
2. Studying the bench, machine and working surface.
3. Designing a chair or stool to fit the case, always keeping in mind, height, seat, back-rest, foot-rest, and any special features which may be involved.
4. Trying out a few samples of the proposed model, and if they prove satisfactory, seeing that they are properly installed.

The manufacturer who acknowledges poor seating as one of the roots of his employees' fatigue and eliminates it, installing instead correctly constructed seating—seating that is adjustable so that it can be set at the proper height for each operator, with a sufficiently large wood saddle-shaped seat, an adjustable well designed back rest and a foot rest if necessary—at a comparatively small cost, not only improves the employees' comfort, health and morale, but at the same time increases his own profits.

Health Problems Involved in Noise and Fatigue. HENRY J. SPOONER. The Nation's Health, February and March, 1922, Vol. 4, Nos. 2 and 3.

Shows that rhythm, cadences, and periodicities regulate human activities, but noise lessens the aptitude for work. Noise produces aural fatigue. A definite causal relation between aural fatigue and general fatigue is shown. The basic facts concerning noise are mentioned and the primary noises are classified. The remedies suggested are such practical ones as well cared for machinery, sound deadeners, and most important of all, wide spread propaganda against noise. In conclusion, anticipates great advances in noise prevention and reduction in the future, since it has been shown to be productive of greater output in the past.

Industrial Home Work of Children. U. S. Department of Labor, Children's Bureau, 1922.

Gives results of a study of industrial home work by children in three Rhode Island cities at a time when none of the labor laws of the state applied to work done at home. At least 5000 children under 16 years of age had done home work in the course of a year, over 7 per cent of all the children 5 to 15 years of age, inclusive, in the three cities, had been engaged in such work during that period, and 3.5 per cent had worked for 30 days or more. Of these 2338 children who had worked at least one month out of the year and had received compensation, 4 per cent were under 6 years of age and 46 per cent were under the age of 11.

The standards set up by the State of Rhode Island for school children working in factories were violated in the case of home-working children in four respects: Children of school age remained at home occasionally or for extended periods to do home work, contrary to the compulsory school-attendance law of the State; children under the age of 14 were engaged at home in kinds of work which the law prohibited them from doing in factories; children under the age of 16 who worked in factories did overtime work at home contrary to the spirit of the law limiting hours of labor; and children injured in the course of home work did not receive compensation under the workmen's compensation law. Injuries, especially accidents from machines installed in the homes, in addition to eye strain and fatigue reacting upon school work were frequent.

Twenty-one industries, among which the jewelry industry led, were represented by the 258 manufacturing establishments distributing home work in the district of the study; 153 establishments were covered by the inquiry. The principal kinds of work included carding snaps, stringing tags, drawing threads from lace, linking and wiring rosary beads, setting stones in jewelry, and assembling military buttons.

Four-fifths of the 956 children who reported earnings could not make, at the rates paid, so much as 10 cents an hour working at top speed; half could not make 5 cents. Of the families reporting total yearly earnings from home work, almost nine-tenths earned less than $100 and nearly three-fifths earned less than $25. These earnings in nearly all cases represented compensation for the work of more than one person; in over two-thirds of the families included at least three persons had engaged in home work.

A possible danger to the health of the community was found in the fact that large numbers of families reported doing home work while members of the family were ill with infectious diseases. In some cases the sick persons took part in the work.

The testimony of manufacturers using the home-work system indicates that industrial home work in this district could be abolished with few business losses.

Wages and Hours of Labor in Bituminous Coal Mining. U. S. Department of Labor. Monthly Labor Review, April, 1922, 14, No. 4, 1–8.

The inquiry reported extended into 11 states and included 200 mines. The period covered was the fall and winter of 1921–1922. Definitions are given of various terms used in the tables. The days of operation of the mines covered, in the year ending October

31, 1921, were 195.7 or about 60 per cent of full time. The average days of operation of all bituminous mines in the calendar year 1921 was 168. The highest number of days reported was 310, lowest, 71. Highest estimated average earnings during year was $2,210.93, lowest, $929.88. The average of these averages reported was $1,357.40. The figures on earnings represent the average earnings in the year ending October 31 that would have been made had each employee worked the full number of days the mine was in operation and made as much per start during the year as he averaged during the half-month pay period studied.